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# TRANSACTIONS

OF THE

# COLLEGE OF PHYSICIANS

OF

# PHILADELPHIA

THIRD SERIES

VOLUME THE FORTIETH

PHILADELPHIA
PRINTED FOR THE COLLEGE
1918

## NOTICE

The present volume of TRANSACTIONS contains the papers read before the College from January, 1918, to December, 1918, inclusive.

The Committee of Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

EDITED BY

WALTER G. ELMER, M.D.

"This volume is published in part by the income from the Francis Houston Wyeth Fund."

DORNAN, PRINTER

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OF THE

# PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION

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| 1805 | WILLIAM SHIPPEN |
| 1809 | ADAM KUHN |
| 1818 | THOMAS PARKE |
| 1835 | THOMAS C. JAMES[1] |
| 1835 | THOMAS T. HEWSON |
| 1848 | GEORGE B. WOOD |
| 1879 | W. S. W. RUSCHENBERGER |
| 1883 | ALFRED STILLÉ |
| 1884 | SAMUEL LEWIS[2] |
| 1884 | J. M. DA COSTA |
| 1886 | S. WEIR MITCHELL |
| 1889 | D. HAYES AGNEW |
| 1892 | S. WEIR MITCHELL |
| 1895 | J. M. DA COSTA |
| 1898 | JOHN ASHHURST, JR. |
| 1900 | W. W. KEEN |
| 1902 | HORATIO C. WOOD |
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| 1907 | JAMES TYSON |
| 1910 | GEORGE E. DE SCHWEINITZ |
| 1913 | JAMES CORNELIUS WILSON |
| 1916 | RICHARD H. HARTE |

[1] Died four months after his election.
[2] Resigned on account of ill-health.

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1918

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*Clerk*, WALTER G. ELMER, M.D.

* Deceased.

# FELLOWS

OF THE

# COLLEGE OF PHYSICIANS OF PHILADELPHIA

## DECEMBER, 1917

* Non-resident Fellows.
† Fellows who have commuted dues.

ELECTED

1912. Addison, William H. F., A.B., M.D., Assistant Professor of Normal Histology and Embryology in the University of Pennsylvania. Medical Laboratories, University of Pennsylvania.

1905. Adler, Lewis H., Jr., M.D., Professor of Diseases of the Rectum in the Philadelphia Polyclinic and College for Graduates in Medicine; formerly Prosector to the Professor of Anatomy in the University of Pennsylvania; Consulting Surgeon to the Charity Hospital. 1610 Arch St.

1914. Aiken, Thomas Gerald, M.D., Assistant Visiting Physician to the Chester County Hospital, West Chester, Pa.; Pathologist to the Country Branch of the Rush Hospital for Tuberculosis. Berwyn, Pa.

1913. Alexander, Emory G., M.D., Surgeon to St. Christopher's Hospital for Children; Associate Surgeon to the Episcopal Hospital; Clinical Professor of Surgery in the Woman's Medical College of Pennsylvania, and Demonstrator of Fracture Dressings in the Jefferson Medical College; Assistant Surgeon to the Kensington Hospital for Women. 1627 Oxford St.

1903. Allen, Alfred Reginald, M.D., Lecturer on Neurological Electrotherapeutics and Instructor in Neurology and Neuropathology in the University of Pennsylvania. 2013 Spruce St.

ELECTED

1906. Allen, Francis Olcott, Jr., A.B., M.D., Surgeon to the Presbyterian and the Children's Hospital; Assistant Surgeon to the Bryn Mawr Hospital; Surgeon to the Out-patient Department of the Pennsylvania Hospital. 2216 Walnut St.

1896. Allyn, Herman B., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia General Hospital. 501 S. Forty-second St.

1888. Anders, James M., M.D., L.L.D., Professor of Medicine and Clinical Medicine in the Medico-Chirurgical College; Officer de l'Instruction Publique. 1605 Walnut St.

1905. Anspach, Brooke M., M.D., Associate in Gynecology in the University of Pennsylvania; Gynecologist and Obstetrician to the Philadelphia General and the Stetson Hospitals; Assistant Gynecologist to the University Hospital; Attending Gynecologist to the Bryn Mawr Hospital. 1827 Spruce St.

1905. Appleman, Leighton F., M.D., Demonstrator of Pharmacy and Materia Medica, and Instructor in Therapeutics in the Jefferson Medical College; Ophthalmologist to the Polyclinic Section of the University of Pennsylvania; Ophthalmologist to the Frederick Douglass Memorial Hospital and to the Burd School. 308 S. Sixteenth St.

1906. Ashhurst, Astley Paston Cooper, A.B., M.D., Instructor in Surgery in the University of Pennsylvania; Surgeon to the Episcopal Hospital and to the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases. 811 Spruce St.

1893. Ashton, Thomas G., M.D., Physician to the Philadelphia General Hospital. 1814 S. Rittenhouse Square.

1914. Austin, J. Harold, B.S. (Univ. of Penna.), M.D., Department of Research Med., University of Pennsylvania. Ardmore, Pa.

1906. Babbitt, James A., A.B., (Yale), A.M. (Haverford), M.D., Professor of Hygiene and Physical Education at Haverford College; Assistant Laryngologist and Aurist, and Chief of the Out-patient Department for Diseases of the Nose, Throat, and Ear at the Lankenau Hospital; Assistant Instructor in Otology in the University of Pennsylvania; Laryngologist to the Out-patient Department of the Children's Hospital. 1901 Chestnut St.

1910. Baer, Benjamin F., Jr., M.D. 2040 Chestnut St.

†1892. Baker, George Fales, B.S., M.D. 1818 Spruce St.

1911. Baldwin, James Harvey, A.B., M.D., Assistant Surgeon to the Methodist Hospital. 1426 Pine St.

ELECTED

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital; Consulting Surgeon to the Jewish and the Frederick Douglass Memorial Hospitals. 2219 De Lancey Place.

1916. Balentine, Percival L., M.D., Assistant Surgeon, Wills Eye Hospital; Demonstrator of Ophthalmic Surgery in the Philadelphia Polyclinic. 302 Weightman Building, 1524 Chestnut St.

1898. Balliet, Tilghman M., A.M., M.D., Professor of Therapeutics at Dartmouth College, Hanover, N. H.; Physician to the Old Man's Home. 3709 Powelton Ave.

1911. Barnard, Everett P., M.D., Obstetrician to the Maternity Hospital; Assistant Instructor in Obstetrics in the University of Pennsylvania. 119 S. Nineteenth St.

1883. Baum, Charles, A.M., M.D., Ph.D. 1828 Wallace St.

1908. Beardsley, Edward J. G., M.D., L.R.C.P. (Lond.), Associate Professor of Clinical Medicine in the Jefferson Medical College; Chief Clinical Assistant in the Out-patient Medical Department of the Jefferson Medical College Hospital; Assistant Physician to the Jefferson and Philadelphia Hospitals. 258 S. Sixteenth St.

*1916. Bell, William Hemphill, M.D., Medical Director, U. S. N., U. S. Naval Station, Naval Operating Base, Hampton Roads, Va.

*1874. Bennett, W. H., A.M., M.D., Physician-in-Charge of the Seashore House for Invalid Children, and of the Seaside House for Invalid Women, Atlantic City; formerly Physician to the Episcopal Hospital, and Physician-in-Charge of St. Christopher's Hospital for Children. Children's Seashore House, Atlantic City, N. J.

1896. Beyea, Henry D., M.D., Associate in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital. 1734 Spruce St.

*1903. Biggs, Montgomery H., M.D., Surgeon to the Rutherford Hospital; Chief Surgeon of the Carolina, Churchfield and Ohio Railway. Rutherfordton, N. C.

1918. Billings, Arthur E., M.D. 252 S. Sixteenth St.

1917. Birdsall, Joseph C., A.B., A.M., M.D., Urologist, Polyclinic Section of the Medico-Chirurgical College and Hospital Graduate School of Medicine of the University of Pennsylvania; Chief of the Genito-urinary Dispensary and Assist-

ELECTED

ant Genito-urinary Surgeon, Presbyterian Hospital; Instructor in Surgery, University of Pennsylvania. 3459 Chestnut St.

1908. Bland, Pascal Brooke, M.D., Chief Clinical Assistant in the Gynecological Department of the Jefferson Medical College Hospital; Instructor in Gynecology in the Jefferson Medical College; Gynecologist to St. Joseph's Hospital; Assistant Gynecologist to the Philadelphia General Hospital. 1621 Spruce St.

1917. Block, Frank B., M.D. Hotel Lorraine, Broad and Fairmount Ave.

1894. Bochroch, Max H., M.D., Neurologist to the St. Joseph's and Jewish Hospitals; Physician to the Psychopathic Wards of the Philadelphia General Hospital. 1539 Pine St.

1896. Boger, John A., A.M., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Stetson Hospital; Surgeon to the Dispensary of the Episcopal Hospital. 2213 N. Broad St.

1910. Boice, J. Morton, A.B., M.D., Gynecologist to the Outpatient Department of St. Joseph's Hospital. 4020 Spruce Street.

1911. Bonney, Charles W., A.B., M.D., Associate in Topographic and Applied Anatomy in the Jefferson Medical College. 1117 Spruce St.

1913. Boston, L. Napoleon, A.M., M.D., Professor of Physical Diagnosis in the Medico-Chirurgical College; Physician to the Philadelphia General Hospital; Pathologist to the Frankford Hospital. 1819 Chestnut St.

1891. Boyd, George M., M.D., Professor of Obstetrics in the Medico-Chirurgical College; Obstetrician to the Medico-Chirurgical Hospital; Physician to the Philadelphia Lying-in Charity; Obstetrician and Gynecologist to the Philadelphia General Hospital. 1909 Spruce St.

1907. Boyer, Henry Percival, M.D., Neurologist to the Stetson Hospital; Physician to the Philadelphia Home for Incurables; Assistant Physican to the Orthopædic Hospital and Infirmary for Nervous Diseases. 4602 Baltimore Ave.

1907. Bradley, William N., Ph.G., M.D., Pediatrist to Howard Hospital. 1638 S. Broad St.

1903. Branson, Thomas F., M.D., Attending Physician to the Bryn Mawr Hospital. Rosemont, Pa.

1891. Brinton, Lewis, M.D., Physician-in-Chief to the American Hospital for Diseases of the Stomach. 1301 Medical Arts Bldg., Sixteenth and Walnut Sts.

ELECTED

1900. Brinton, Ward, A.M., M.D., Visiting Physician to the Tuberculosis Department of the Philadelphia General Hospital; Visiting Physician to the Hospital for Poor Consumptives at White Haven, Pa.; Visiting Physician to the Philadelphia Jewish Sanatorium for Consumptives. 1423 Spruce St.

1917. Bromer, Ralph S., M.D. 314 S. Fifteenth St.

1907. Brooks, Macy, A.B. (Princeton), M.D., Assistant Genito-urinary Surgeon to the Philadelphia General Hospital. 1321 Spruce St.

1916. Brown, Samuel Horton, M.D. 1901 Mt. Vernon St.

1887. Brubaker, Albert P., A.M., M.D., Professor of Physiology and Medical Jurisprudence in the Jefferson Medical College; Professor of Physiology and Hygiene in the Drexel Institute of Science, Art, and Industry. 3426 Powelton Ave.

1916. Buckley, Albert Coulson, M.D., Medical Superintendent, Friends' Hospital, Frankford; Clinical Professor of Mental Diseases, Graduate School, University of Pennsylvania; Alienist to the Orthopædic Hospital and Infirmary for Nervous Diseases. Friends' Hospital, Frankford, Phila.

1906. Burns, Stillwell C., M.D., Surgeon to the Graduate School of Medicine, Polyclinic Section, University of Pennsylvania. 1326 Spring Garden St.

1892. Burr, Charles W., M.D., Professor of Mental Diseases in the University of Pennsylvania; Neurologist to the Philadelphia General Hospital. 1918 Spruce St.

1906. Butler, Ralph, M.D., Professor of Diseases of the Nose and Throat in the Philadelphia Polyclinic and the College for Graduates in Medicine; Chief of the Dispensary for Diseases of the Ear at the University Hospital; Assistant Professor of Otology in the University of Pennsylvania; Laryngologist and Aurist to the Lankenau Hospital. 1926 Chestnut St.

*1908. Cadbury, William W., A.M., M.D., Canton Christian College, Canton, China.

†1907. Cadwalader, Williams B., M.D., Pathologist and Clinical Assistant to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Instructor in Nervous Diseases in the Philadelphia Polyclinic. 1501 Spruce St.

1905. Cameron, George A., M.D., Physician to the Germantown Hospital. S. E. cor. Schoolhouse Lane and Greene St., Germantown.

ELECTED

1905. Carmany, Harry S., M.D., Surgeon to St. Timothy's Hospital, Roxborough; Associate Surgeon of the Episcopal Hospital; Surgeon to the Dispensary of the Episcopal Hospital. 366 Green Lane, Roxborough.

1910. Carnett, John Berton, M.D., Associate in Surgery in the University of Pennsylvania; Assistant Surgeon to the University and the Philadelphia General Hospitals; Surgeon to the Chestnut Hill Hospital; Consulting Surgeon to the Henry Phipps Institute, to the Phœnixville Hospital, and to the Eastern Pennsylvania Institution for the Feeble-minded and Epileptic. 123 S. Twentieth St.

1905. Carpenter, Herbert B., M.D., Physician to the Dispensary of the Children's Hospital. 1805 Spruce St.

1895. Carpenter, John T., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Assistant Ophthalmic Surgeon to the University Hospital; Attending Ophthalmologist to the Bryn Mawr Hospital. 2039 Chestnut St.

1917. Carson, John B., M.D. 348 S. Sixteenth St.

1892. Cattell, Henry W., A.M., M.D. 3709 Spruce St.

1900. Chance, Burton, M.D., Attending Surgeon to the Wills Eye Hospital; Consulting Ophthalmologist Eastern Pennsylvania Institution for the Feeble-minded and Epileptic; Ophthalmic Surgeon to the Pennsylvania Railroad Company. 235 S. Thirteenth St.

*1868. Cheston, D. Murray, M.D. Harwood P. O., Md.

1897. Cheston, Radcliffe, M.D., Visiting Physician to the Chestnut Hill Hospital; Consulting Physician to the Germantown Hospital, and to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill.

1904. Christian, Hilary M., M.D., Clinical Professor of Genito-urinary Diseases in the Medico-Chirurgical College. 1321 Spruce St.

1903. Chrystie, Walter, M.D. One of the Senior Physicians to Bryn Mawr Hospital. Bryn Mawr, Pa.

1899. Clark, John G., M.D., Professor of Gynecology in the University of Pennsylvania; Gynecologist-in-Chief to the University Hospital. 2017 Walnut St.

1896. Cleveland, Arthur H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Laryngologist to the Medico-Chirurgical Hospital; Laryngologist and Aurist to the Presbyterian Hospital, and to Pennsylvania Institution for Deaf and Dumb. 256 S. Fifteenth St.

ELECTED

1910. Cloud, J. Howard, M.D., Assistant Physician to the Bryn Mawr Hospital; Attending Physician to the Children's House of Bryn Mawr Hospital. 7 W. Lancaster Ave., Ardmore, Pa.

1903. Coates, George Morrison, A.B., M.D., Surgeon to the Out-Patient Department for Diseases of the Ear, Throat, and Nose of the Pennyslvania Hospital; Professor of Diseases of the Ear in the Philadelphia Polyclinic; Consulting Laryngologist to the Philadelphia Orphanage. 1736 Pine St.

1908. Codman, Charles A. E., M.D., Physician to the American Oncologic Hospital. 4116 Spruce St.

1907. Cohen, Myer Solis, A.B., M.D., Pediatrist to the Jewish Hospital, and to the Philadelphia Jewish Sanatorium for Consumptives, Eagleville, Pa.; Assistant Visiting Physician to the Philadelphia General Hospital; Consulting Physician to the Home for Consumptives, Chestnut Hill. 4102 Girard Ave.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital, to the Philadelphia General Hospital, to the Jewish Hospital, and to the Rush Hospital. 1525 Walnut St.

1898. Coles, Stricker, M.D., Assistant Professor of Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson and the Philadelphia General Hospitals; Visiting Physician to the Philadelphia Lying-in-Charity Hospital. 2103 Walnut St.

1901. Coley, Thomas Luther, A.B., M.D., Attending Physician Methodist Episcopal Hospital, Philadelphia. 256 S. Fifteenth St.

1903. Coplin, W. M. L., M.D., Professor of Pathology in the Jefferson Medical College; Pathologist to and Director of the Laboratories of the Jefferson Medical College Hospital; Pathologist to the Philadelphia General Hospital and to the Friends' Asylum for the Insane, Frankford; Bacteriologist to the Pennsylvania State Board of Health. 606 S. Forty-eighth St.

1912. Copp, Owen, A.B., M.D., Physician-in-chief and Superintendent of the Pennsylvania Hospital for the Insane. Pennsylvania Hospital for the Insane, Forty-fourth and Market Sts.

1911. Cornell, Walter Stewart, A.B., M.D., Director of Medical Inspection of Public Schools of the City of Philadelphia; Chief of Medical Staff of the House of Detention; Lecturer

ELECTED

on Osteology in the University of Pennsylvania; Lieutenant, Medical Reserve Corps, U. S. A. 729 City Hall.

1914. Corson, Edward Foulke, M.D., Physician for Diseases of the Skin, Presbyterian Hospital Dispensary; Assistant Dermatologist, Children's Hospital Dispensary. Cynwyd, Pa.

1907. Council, Malcolm S., M.D., Attending Physician to the Bryn Mawr Hospital; Attending Physician to the Cathcart Home at Devon. Bryn Mawr, Pa.

*1909. Craig, Alexander R., A.M., M.D. 535 N. Dearborn St., Chicago, Ill.

1904. Craig, Frank A., M.D., Instructor in Medicine in the University of Pennsylvania; Visiting Physician to the Henry Phipps Institute, University of Pennsylvania; Visiting Physician to the White Haven Sanatorium; Physician-in-Charge of the Tuberculosis Class of the Presbyterian Hospital. 244 S. Twenty-first St.

1907. Crampton, George S., M.D., Attending Surgeon to the Eye Department of the Pennsylvania Hospital and the Philadelphia Hospital for Contagious Diseases; Assistant Surgeon to the Wills Hospital; Lecturer on Physiologic Optics in the Philadelphia Polyclinic and School for Graduates in Medicine; Ophthalmologist to the Philadelphia Orphanage. 1700 Walnut St.

1917. Cross, Sumner H., A.B., M.D., Physician to the Abington Memorial Hospital, Abington, Pa. 412 York Road, Jenkintown, Pa.

1904. Cruice, John M., M.D., Physician to the Henry Phipps Institute of the University of Pennsylvania; Physician to the Medical Dispensary of St. Agnes' Hospital; Instructor in Medicine in the University of Pennsylvania. 1932 Spruce St.

*1910. Cummins, W. Taylor, M.D., Pathologist to the Southern Pacific Hospital; Director of the Mary W. Harriman Research Laboratory, San Francisco, Cal.

1902. Currie, Charles A., M.D., Physician to the Germantown Hospital. West Walnut Lane, Germantown.

1903. Da Costa, John C., Jr., M.D., Associate Professor of Medicine in the Jefferson Medical College; Assistant Physician to the Jefferson Medical College Hospital; Hematologist to the German Hospital; Consulting Physician to the Northwestern General Hospital. 1529 Pine St.

ELECTED

1896. Da Costa, John Chalmers, M.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Surgeon to the Philadelphia General and St. Joseph's Hospitals. 2045 Walnut St.

1887. Daland, Judson, M.D., Professor of Medicine in the Graduate School of Medicine, University of Pennsylvania. 317 S. Eighteenth St.

°1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital. Preston Apartments, Atlantic City, N. J.

1896. Davis, Charles N., M.D., Dermatologist to the Pennsylvania Hospital; Consulting Dermatologist to St. Agnes' Hospital; Assistant Physician to the Dispensary for Skin Diseases in the Howard Hospital. 1931 Spruce St.

1888. Davis, Edward P., A.M., M.D., Professor of Obstetrics in the Jefferson Medical College; Obstetrician to the Jefferson Hospital; Obstetrician and Gynecologist to the Philadelphia General Hospital; Consultant to the Preston Retreat. 250 S. Twenty-first St.

1916. Davis, Warren B., M.D., Oral Surgeon, Philadelphia General Hospital; Assistant Rhinologist and Otologist St. Agnes' Hospital; Assistant Demonstrator of Anatomy Jefferson Medical College; Clinical Assistant in Surgical Dispensary Jefferson Hospital. 135 S. Eighteenth St.

1900. Davisson, Alex. Heron, M.D., Physician-in-Charge, State Tuberculosis Dispensary at Ardmore, Pa. 1017 S. Forty-sixth St.

1894. Deaver, Harry C., M.D., Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Episcopal Hospital, and to the Children's Hospital of the Mary J. Drexel Home; Surgeon-in-Chief to the Kensington Hospital for Women. 1701 Spruce St.

1887. Deaver, John B., M.D., D.Sc., LL.D., John Rea Barton Professor of Surgery, University of Pennsylvania; Visiting Surgeon, Hospital of the University of Pennsylvania; Surgeon-in-Chief to the Lankenau Hospital. 1634 Walnut St.

1902. Dehoney, Howard, M.D. 240 S. Thirteenth St.

1885. Dercum, Francis X., A.M., M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College; Consulting Neurologist to the Philadelphia General Hospital; Foreign Corresponding Member of the Neurological Society of Paris, and Corresponding Member of the Psychiatric and Neurological Society of Vienna. 1719 Walnut St.

ELECTED

1908. Despard, Duncan L., M.D., Surgeon to the Abington Memorial Hospital; Assistant Surgeon to the Jefferson Medical College Hospital; Demonstrator of Clinical Surgery in the Jefferson Medical College; Associate in Gynæcology in the Philadelphia Polyclinic Hospital. 1806 Pine St.

1912. Dewey, J. Hiland, Ph.B., M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmic Surgeon to St. Francis' Hospital, Trenton, N. J. 1436 Diamond St.

*1911. Dickson, Frank D., M.D. St. Regis Hotel, Kansas City, Mo.

1908. Dillard, Henry K., Jr., M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Physician to the Dispensary of the Mary J. Drexel Home. 234 S. Twentieth St.

*1897. Dorland, W. A. Newman, A.M., M.D., Professor of Gynecology in the Post-graduate Medical School of Chicago; Professor of Obstetrics in the Chicago College of Medicine and Surgery; Visiting Obstetrician to Cook County Hospital; First Lieutenant, Medical Reserve Corps, U. S. Army. 7 West Madison St., Chicago, Ill.

1907. Dorrance, George Morris, M.D., Surgeon to St. Agnes' Hospital; Demonstrator of Applied Anatomy in the Dental Department of the University of Pennsylvania. 2025 Walnut St.

°1864. Downs, R. N., M.D., Consulting Physician to the Germantown Hospital. 5916 Greene St., Germantown.

1902. Downs, Robert N., Jr., M.D., Surgeon to the Dispensary of the Germantown Hospital. 6008 Greene St., Germantown.

1910. Drayton, William, Jr., M.D., Physician to the Philadelphia Hospital for Contagious Diseases; Physician to the Out-patient Department of the Pennsylvania Hospital; Physician to the Pennsylvania Institute for the Instruction of the Blind; Assistant Physician to the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases. 1316 Locust Street.

1881. Dulles, Charles Winslow, M.D., Consulting Surgeon of the Rush Hospital. 4101 Walnut St.

1911. Earnshaw, Henry Culp, M.S., M.D., Attending Physician to the Hospital of the Good Shepherd, Rosemont; Assistant Attending Physician to the Bryn Mawr Hospital; Attending Physician to the Bryn Mawr Children's Hospital; Pennsylvania Railroad Surgeon. Bryn Mawr, Pa.

ELECTED

*1887. Edwards, William A., M.D., Professor of Pediatrics in the Medical Department of the University of California. Fifth and Spring Sts., Los Angeles, Cal.

1911. Eliason, Eldridge E., B.A., M.D., Assistant Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Assistant Surgeon to the Howard Hospital; Surgeon to the Out-patient Department of the Children's Hospital. 320 S. Sixteenth Street.

1904. Elmer, Walter G., B.S., M.D., Instructor in Orthopedic Surgery in the University of Pennsylvania; Assistant Orthopedic Surgeon to the University Hospital; Orthopedic Surgeon to the Jewish Hospital; Surgeon to the Pennsylvania Training School for Children. 1801 Pine St.

1896. Ely, Thomas C., A.M., M.D. 2041 Green St.

1901. Erck, Theodore A., M.D., Surgeon to the Gynecean Hospital; Obstetrician to the Jewish Maternity Hospital; Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine. 251 S. Thirteenth St.

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic and College for Graduates in Medicine; Physician to the Philadelphia General Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Physician to Mercy Hospital. 1019 Spruce St.

*1905. Evans, Joseph S., Jr., A.B., M.D., Professor of Clinical Medicine in the University of Wisconsin; Consulting Physician, Madison General Hospital. University of Wisconsin, Madison, Wis.

1905. Evans, William, M.D. 4007 Chestnut St.

1912. Eves, Curtis C., M.D., Aural and Laryngeal Surgeon to the Episcopal Hospital; Assistant in the Out-patient Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Demonstrator of Operative Surgery of the Ear, Nose, and Throat in the Philadelphia Polyclinic. 247 S. Seventeenth St.

1894. Faries, Randolph, M.D. 2007 Walnut St.

†1903. Farr, Clifford B., A.B., M.D., Professor of Diseases of the Stomach, etc., in the Philadelphia Polyclinic; Associate in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia General Hospital. 1824 Pine St.

ELECTED

1893. Farr, William W., M.D., Physician to the Leamy Home. Springfield Ave. and Lincoln Drive, Chestnut Hill.

1884. Fenton, Thomas H., M.D., Ophthalmic Surgeon to St. Vincent's Home, the Baptist Home and the Widener Home for Crippled Children. 1319 Spruce Street.

1907. Fetterolf, George, A.B., M.D., Sc.D., Laryngologist to the Henry Phipps Institute for Tuberculosis; Laryngologist to the White Haven Sanatorium; Consulting Laryngologist to the Phœnixville Hospital; Demonstrator of Anatomy in the University of Pennsylvania. 2047 Chestnut St.

1907. Fife, Charles A., A.B., M.D., Instructor in Pediatrics in the University of Pennsylvania; Pediatrist to the Presbyterian Hospital; Physician to the St. Christopher's Hospital for Children; Assistant Physician to the Philadelphia General Hospital. 2038 Chestnut St.

1884. Fisher, Henry M., M.D. 1027 Pine St.

1910. Fisher, John Monroe, M.D., Associate Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Philadelphia, St. Agnes', and Pottstown Hospitals; Assistant Gynecologist to the Jefferson Medical College Hospital. 222 S. Fifteenth St.

1888. Flick, Lawrence F., M.D. 736 Pine St.

1916. Forst, John R., M.D. 166 W. Coulter St., Germantown.

1908. Foulkrod, Collin, M.D., Obstetrician to the Maternity House of the Presbyterian Hospital; Assistant Demonstrator of Obstetrics in Jefferson Medical College; Gynecologist to the Dispensary of the Presbyterian Hospital. 4005 Chestnut St.

1908. Fox, Herbert, M.D., Director of the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania; Pathologist to the Laboratory of Comparative Pathology of the Zoölogical Society of Philadelphia; Pathologist to the Rush Hospital; Pathologist to the Children's Hospital. 3902 Locust St.

†1885. Fox, Joseph M., M.D. Torresdale, Pa.

1906. Fraley, Frederick, Jr., A.B., M.D. 1701 De Lancey Place.

1903. Francine, Albert Philip, A.M., M.D., Associate in Medicine in the University of Pennsylvania; Visiting Physician to the Philadelphia General Hospital, Department of Tuberculosis; Physician-in-Chief to the State Dispensary for Tuberculosis, Philadelphia. 264 S. Twenty-first St.

ELECTED

1897. Frazier, Charles H., A.B., M.D., Sc.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University Hospital. 1724 Spruce St.

†1890. Freeman, Walter J., M.D., Emeritus Professor of Laryngology in the Philadelphia Polyclinic; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 1832 Spruce St.

1916. Funk, Elmer Hendricks, M.D. 1318 Spruce St.

1910. Furbush, Charles Lincoln, M.D. 4300 Spruce St.

1889. Fussell, M. Howard, M.D., Professor of Applied Therapeutics in the University of Pennsylvania; Physician to the University Hospital, the Episcopal Hospital, St. Timothy's Hospital, and St. Mary's Hospital. 2035 Walnut St.; 421 Lyceum Ave., Roxborough.

1899. Gamble, Robert G., M.D., one of the Attending Physicians to the Bryn Mawr Hospital. Haverford, Pa.

1912. Gaskill, Henry Kennedy, M.D., Assistant Professor of Dermatology in the Jefferson Medical College; Attending Dermatologist to the Philadelphia General Hospital. N. E. Cor. 16th and Spruce Sts.

1917. Gerhard, Arthur Howell, M.D. 2110 Pine St.

1873. Gerhard, George S., M.D., Physician-in-Chief to the Bryn Mawr Hospital; Consulting Physician to Bryn Mawr College; Consulting Physician to Villa Nova College. Fifty-eighth Street and Overbrook Ave.

1902. Ghriskey, Albert A., M.D. 3936 Walnut St.

1899. Gibbon, John H., M.D., Professor of Surgery in the Jefferson Medical College; Surgeon to the Pennsylvania and the Bryn Mawr Hospitals. 1608 Spruce St.

1908. Gildersleeve, Nathaniel, M.D., Professor of Microbiology and Bacteriopathology; The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania. School of Dentistry, University of Pennsylvania.

*1913. Ginsburg, Nathaniel, M.D., Surgeon to the Jewish Hospital; Associate in Surgery in the Philadelphia Polyclinic and College for graduates in Medicine; Assistant Surgeon to Mt. Sinai Hospital; Instructor in Anatomy in the University of Pennsylvania. 2587 Woodward Ave., Detroit, Mich.

1897. Girvin, John H., M.D., Physician for Diseases of Women at the Presbyterian Hospital; Instructor in Obstetrics in the University of Pennsylvania. 2120 Walnut St.

ELECTED

1906. Gittings, J. Claxton, M.D., Instructor in Pediatrics in the University of Pennsylvania; Assistant Pediatric Physician to the University Hospital; Visiting Physician to the Children's Hospital; Consulting Physician to the Sheltering Arms and the Presbyterian Orphanage. 3903 Chestnut St.

1905. Given, Ellis E. W., M.D., Surgeon to the Philadelphia Freemasons Memorial Hospital of the Masonic Home, Elizabethtown, Pa.; Surgeon to the Dispensary of the Episcopal Hospital. 2018 Chestnut St.

1894. Gleason, E. B., S.B., M.D., LL.D., Professor of Otology in the Medico-Chirurgical College. 2033 Chestnut St.

1906. Goepp, R. Max, M.D., Professor of Clinical Medicine, Dean of the College Department, and Secretary of the Faculty of the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Professor of Clinical Medicine in the Jefferson Medical College; Assistant Visiting Physician to the Philadelphia General Hospital. 124 S. Eighteenth St.

1906. Goldberg, Harold G., M.D., Ophthalmic Surgeon to the Episcopal Hospital and to the Kensington Hospital for Women. 1925 Chestnut St.

1908. Goodman, Edward H., M.D., Associate in Medicine in the University of Pennsylvania; Consultant to the Medical Dispensary of the University Hospital; Assistant Physician to the University Hospital; Assistant Physician to the Philadelphia General Hospital. 248 S. Twenty-first St.

1905. Gordon, Alfred, M.D., Neurologist to the Mt. Sinai, the Northwestern General, and the Douglass Memorial Hospitals. 1812 Spruce St.

*†1897. Gould, George M., A.M., M.D. 215 Atlantic Ave., Atlantic City, N. J.

1894. Graham, Edwin E., M.D., Professor of Pediatrics in the Jefferson Medical College; Pediatrist to the Jefferson and the Philadelphia General Hospitals; Physician to the Franklin Reformatory Home. 1713 Spruce St.

1885. Graham, John, M.D. 326 S. Fifteenth St.

1904. Grayson, Charles P., M.D., Professor of Laryngology and Rhinology in the University of Pennsylvania; Physician-in-Charge of the Throat and Nose Department of the University Hospital; Otolaryngologist to the Philadelphia General Hospital. 262 S. Fifteenth St.

ELECTED

1910. Greenman, Milton J., M.D., Sc.D., Director of the Wistar Institute of Anatomy and Biology. Wistar Institute of Anatomy and Biology, Thirty-sixth St. and Woodland Ave.

1883. Griffith, J. P. Crozer, M.D., Professor of Pediatrics in the University of Pennsylvania; Corresponding Member of the Société de Pédiatrie de Paris. 1810 Spruce St.

1912. Griscom, J. Milton, B.S., M.D., Assistant Surgeon to the Wills Eye Hospital; Chief of Clinic of the Eye Dispensary of the Presbyterian Hospital. 1925 Chestnut St.

1911. Gummey, Frank Bird, M.D., Visiting Physician to the Germantown Hospital and Dispensary; Visiting Physician to the Midnight Mission. 5418 Greene St., Germantown.

*1902. Gwyn, Norman B., M.D., Instructor in Medicine in the University of Pennsylvania. 20 S. Twenty-first St.

1894. Hamill, Samuel McC., M.D., Professor of Diseases of Children in the Philadelphia Polyclinic and College for Graduates in Medicine; Pediatrist to the Presbyterian Hospital; Pediatrist to St. Vincent's Home. 1822 Spruce St.

1897. Hand, Alfred, Jr., M.D., Visiting Physician to the Children's Hospital, to the Children's Hospital of the Mary J. Drexel Home, and to the Methodist Hospital. 1724 Pine St.

1886. Hansell, Howard F., M.D., Professor of Ophthalmology in the Jefferson Medical College; Ophthalmic Surgeon to the Philadelphia General Hospital and to the Jefferson Medical College Hospital; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. N. E. Cor. 17th and Walnut Sts

1889. Hare, Hobart A., M.D., Professor of Therapeutics, Materia Medica, and Diagnosis in the Jefferson Medical College, 1801 Spruce St.

1903. Hart, Charles D., A.M., M.D., Inspector and Secretary of the Eastern State Penitentiary; National Executive Committee and Chairman of the Philadelphia Committee, Boy Scouts of America. Chestnut Hill.

1885. Harte, Richard H., M.D., Adjunct Professor of Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania and the Orthopædic Hospitals; Consulting Surgeon to St. Mary's, St. Timothy's, and the Bryn Mawr Hospitals. 1503 Spruce St.

ELECTED

1888. Hartzell, Milton B., A.M., M.D., LL.D., Professor of Dermatology in the University of Pennsylvania. 3644 Chestnut St.

1907. Hatfield, Charles James, A.B (Princeton), M.D. Executive Director of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis; Visiting Physician to the White Haven Sanatorium. 2008 Walnut Street.

1872. Hays, I. Minis, M.D. 266 S. Twenty-first St.

1911. Heed, Charles R., M.D., Associate Professor of Ophthalmology in the Philadelphia Polyclinic; Instructor in Ophthalmology in the Jefferson Medical College; Ophthalmologist to Girard College. 1402 Spruce St.

1908. Heineberg, Alfred, P.D., M.D., Associate in Gynecology in the Jefferson Medical College; Assistant Gynecologist to St. Agnes' Hospital. 1642 Pine St.

1901. Heisler, John C., M.D., Professor of Anatomy in the Medico-Chirurgical College. 3829 Walnut St.

1884. Henry, Frederick P., A.M., M.D., Emeritus Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania; Emeritus Physician to the Philadelphia General Hospital; Consulting Physician to the Chestnut Hill Hospital. 114 S. Eighteenth St.

1903. Henry, J. Norman, M.D., Physician to the Pennsylvania Hospital; Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania; Assistant Physician to the Philadelphia General Hospital. 1906 Spruce St.

1891. Hewson, Addinell, A.B., A.M., M.D., Professor of Anatomy in the Philadelphia Polyclinic and College for Graduates in Medicine; Professor of Anatomy and Histology in the Temple University; Surgeon to St. Timothy's Hospital, Roxborough. 2120 Spruce St.

1909. Higbee, William S., M.D., President of the Pennsylvania State Board of Examiners for Registration of Nurses. 1703 S. Broad St.

1910. Hill, Howard Kennedy, M.D., Assistant Instructor in Medicine in the University of Pennsylvania; Physician to the Children's Medical Dispensary of the Presbyterian Hospital; Visiting Physician to the University Settlement, and to the Day Nursery; Assistant Physician to the Medical Dispensary of the Children's Hospital. Villa Nova, Pa.

ELECTED

1897. Hinkle, William M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory. 1323 N. Thirteenth St.

*1892. Hinsdale, Guy, A.M., M.D., Associate Professor of Climatology in the University of Pennsylvania. Hot Springs, Virginia.

*1888. Hirsh, A. Bern, M.D., Physician to the Home for Aged Couples. 71 West 94th St., New York City.

1888. Hirst, Barton Cooke, A.B., M.D., LL.D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Philadelphia General and the Howard Hospitals. 1821 Spruce Street.

1903. Hirst, John Cooke, M.D., Associate in Obstetrics, University of Pennsylvania; Gynecologist and Obstetrician to the Philadelphia General Hospital; Obstetrician to St. Agnes' Hospital; Gynecologist to the American Hospital for Diseases of the Stomach; Assistant Obstetrician to the University Hospital. 1823 Pine St.

1908. Hitchens, Arthur Parker, M.D. Glenolden, Pa.

1905. Hodge, Edward Blanchard, A.B., M.D., Surgeon to the Presbyterian and the Children's Hospitals; Surgeon to the Out-patient Department of the Pennsylvania Hospital; Associate Surgeon to the Widener Memorial School. 346 S. Sixteenth Street.

1913. Hoffman, Clarence, M.D., 1621 Pine St.

°1885. Holland, James W., A.M., M.D., Sc.D., Emeritus Professor of Medical Chemistry and Toxicology and Dean of the Jefferson Medical College. 2006 Chestnut St.

1906. Holloway, Thomas B., M.D., Professor of Ophthalmology in the Philadelphia Polyclinic and School for Graduates in Medicine; Instructor in Ophthalmology in the University of Pennsylvania; Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases; Ophthalmologist to the Pennsylvania Institution for the Instruction of the Blind at Overbrook. 1819 Chestnut St.

1914. Hooker, Richard S., M.D. 110 S. Nineteenth St.

1908. Hoyt, Daniel M., M.D., Assistant Visiting Physician the Philadelphia General Hospital. 3604 Chestnut St.

*1912. Huber, G. Carl, M.D., Professor of Anatomy and Director of the Anatomic Laboratories in the University of Michigan. 1330 Hill St., Ann Arbor, Mich.

ELECTED

1892. Hughes, William E., M.D., Visiting Physician to the Philadelphia General Hospital; Pathologist to the Presbyterian Hospital. 3945 Chestnut St.

1912. Hunter, John W., B.S., M.D. 2042 Pine St.

1898. Hutchinson, James P., M.D., Surgeon to the Pennsylvania, the Methodist, the Children's, St. Timothy's, and the Bryn Mawr Hospitals; Adjunct Professor of Surgery in the University of Pennsylvania. 133 S. Twenty-second St.

°1871. Ingham, James V., M.D. 1811 Walnut St.

1917. Jackson, Chevalier, M.D. 1830 S. Rittenhouse Sq.

*1885. Jackson, Edward, A.M., M.D., Sc.D., Professor of Ophthalmology in the University of Colorado; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. 318 Majestic Building, Denver, Col.

*1906. Jacobs, Francis Brinton, B.S., M.D., Assistant Surgeon to the Chester County Hospital. Whitford, Pa.

1913. Jefferys, William Hamilton, A.B., A.M., M.D., Surgeon to St. Luke's Hospital, Shanghai; Professor of Surgery in St. John's University, Shanghai; Editor of the China Medical Journal. New Street, Chestnut Hill.

1898. Johnson, Russell H., A.B. (Princeton), M.D., Physician to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill, Philadelphia.

1918. Jonas, Leon.

1900. Jones, Charles James, A.M., M.D., LL.D., Ophthalmic Surgeon to St. Joseph's Hospital; Ophthalmic Surgeon to the House of the Good Shepherd, Germantown; Consulting Ophthalmologist to St. Vincent's Home. 1507 Locust Street.

1914. Jones, Isaac H., A.B., A.M., M.D. Medical Arts Building, Sixteenth and Walnut Sts.

1913. Jones, John F. X., B.S., A.B., A.M., M.D., Surgeon to St. Joseph's Hospital. 1815 Spruce St.

1900. Jopson, John H., M.D., Professor of Surgery in the Philadelphia Polyclinic; Associate in Surgery in the University of Pennsylvania; Surgeon to the Presbyterian and the Children's Hospitals. 1824 Pine St.

1900. Judson, Charles F., A.B., M.D., Physician to St. Christopher's Hospital for Children, to the Southern Home for Destitute Children and to the Sheltering Arms. 1005 Spruce St.

ELECTED

1902. Jump, Henry D., M.D., Assistant Physician to Philadelphia General Hospital; Physician to the Misericordia Hospital. 2019 Walnut St.

1886. Jurist, Louis, M.D. 1308 N. Broad St.

1903. Kalteyer, Frederick J., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Out-patient Department, Assistant Attending Physician, and Hematologist to the Jefferson Medical College Hospital; Pathologist to Philadelphia Lying-in Charity. 1533 Pine St.

*1910. Karsner, Howard T., M.D., Professor of Pathology in the Western Reserve University Medical School. Lakeside Hospital, Cleveland, Ohio.

†1867. Keen, William W., M.D., LL.D., Sc.D. (Hon.) F.R.C.S. (Eng. and Edin.), Emeritus Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Membre Correspondant Etranger de la Société de Chirurgie de Paris; Honorary Member of the Société Belge de Chirurgie and of the Clinical Society of London. 1729 Chestnut St.

1912. Keene, Floyd E., M.D., Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist to the University Hospital; Gynecologist to the Chestnut Hill Hospital. 2017 Walnut St.

1913. Kelly, Francis Joseph, M.D. 1809 Chestnut St.

*1887. Kelly, Howard A., A.B., M.D., LL.D. (Aberdeen, Wash. and Lee, and Univ. of Pa.), Professor of Gynecology in Johns Hopkins University and Gynecologist to the Johns Hopkins Hospital, Baltimore, Md.; Hon. Fellow of the Edinburgh Obstetrical Society, the Royal Academy of Medicine of Ireland, and of the Glasgow Obstetrical and Gynecological Society. 1418 Eutaw Place, Baltimore, Md.

1909. Kelly, James A., A.M., M.D., Visiting Surgeon to St. Mary's and St. Timothy's Hospitals; Associate in Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Visiting Surgeon to St. Joseph's Hospital. 1510 N. Seventeenth St.

1912. Kelly, Thomas C., A.M., M.D., Assistant Instructor of Medicine in the University of Pennsylvania; Pediatrician to St. Mary's Hospital; Physician to Out-patient Department of Germantown Hospital. 105 School Lane, Germantown.

1898. Kempton, Augustus F., M.D. 2118 Pine St.

ELECTED

1905. Kercher, Delno E., M.D. 1534 Pine St.

1913. Klopp, Edward J., M.D., Instructor in Surgery in the Jefferson Medical College; Assistant Surgeon to the Germantown Hospital; Chief Clinical Assistant in the Surgical Department of the Jefferson Hospital; Assistant Surgeon to the Out-patient Department of the Pennsylvania Hospital. 1223 Spruce St.

1895. Kneass, Samuel S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania. 1510 Walnut St.

1908. Knipe, Jay C., M.D., Ophthalmologist to the Jewish Hospital; Assistant Ophthalmologist to the Philadelphia General Hospital, and to the Mary J. Drexel Home; Chief of the Eye Clinic at the Jefferson Medical College Hospital; Demonstrator of Osteology and Syndesmology in the Jefferson Medical College. 2035 Chestnut St.

1908. Knowles, Frank Crozer, M.D., Instructor in Dermatology in the University of Pennsylvania; Clinical Professor of Dermatology in the Woman's Medical College; Dermatologist to the Presbyterian Hospital; Assistant Dermatologist to the Dispensary of the Pennsylvania Hospital. 2022 Spruce Street.

1914. Kolmer, John A., M.D., Dr. P.H., M.Sc., Assistant Professor of Experimental Pathology in the University of Pennsylvania; Professor of Pathology and Pathologist to the Department of Dermatological Research, Philadelphia Polyclinic; Pathologist to the Philadelphia Hospital for Contagious Diseases; Serologist to St. Agnes' and St. Timothy's Hospitals. 927 S. St. Bernard St.

1904. Krauss, Frederick, M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmic and Aural Surgeon to St. Christopher's Hospital for Children; Laryngologist to the Abington Hospital; Ear, Nose and Throat Physician to the Children's Seashore House for Invalid Children, Atlantic City, N. J. 1701 Chestnut Street.

1905. Kremer, Walter H., M.D., 5904 Greene St., Germantown.

1914. Krumbhaar, Edward B., A.B., Ph.D., M.D., Assistant Professor in Research Medicine University of Pennsylvania; Physician to Out-patient Department, Pennsylvania Hospital. W. Mermaid Lane, Chestnut Hill.

ELECTED

1900. Krusen, Wilmer, M.D., Professor of Gynecology in the Medical Department of Temple University; Chief Gynecologist to the Samaritan and the Garretson Hospitals; Consulting Gynecologist to the Charity and Mercy Hospitals. 127 N. Twentieth St.

1909. Laird, J. Packard, M.D., Visiting Physician to the Devon Branch of Presbyterian Hospital of Philadelphia. Devon, Pa.

1904. Landis, Henry R. M., M.D., Director of the Clinical and Sociological Departments of the Henry Phipps Institute of the University of Pennsylvania; Assistant Professor in Medicine in the University of Pennsylvania; Visiting Physician to the White Haven Sanatorium. 11 S. Twenty-first St.

1907. Langdon, H. Maxwell, M.D., Instructor in Ophthalmology in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Diseases of the Eye in the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital; Chief of the Dispensary for Diseases of the Eye of the Presbyterian Hospital. 2018 Chestnut St.

1887. Leaman, Henry, M.D. 832 N. Broad St.

1904. Le Boutillier, Theodore, M.D., Clinical Professor of Pediatrics in the Woman's Medical College of Pennsylvania; Pediatrist to the Woman's College Hospital; Physician to the Philadelphia Hospital for Contagious Diseases and the Babies' Hospital of Philadelphia. Cynwyd, Pa.

1893. Le Conte, Robert G., A.B., M.D., Surgeon to the Pennsylvania and the Bryn Mawr Hospitals; Consulting Surgeon to Germantown and Gynecean Hospitals. 1530 Locust Street.

1908. Lee, Walter Estell, M.D., Surgeon to the Germantown and Children's Hospitals; Surgeon to the Out-Patient Department of the Pennsylvania and Episcopal Hospitals; Assistant Surgeon to the Bryn Mawr and Orthopædic Hospitals. 823 N. 24th St.

1903. Leffmann, Henry, A.M., M.D., D.D.S., Ph.D., Professor of Chemistry in the Woman's Medical College of Pennsylvania; Honorary Professor of Chemistry in the Wagner Free Institute of Science; Pathological Chemist to the Jefferson Medical College Hospital. 1839 N. Seventeenth Street.

ELECTED

1892. Leidy, Joseph, M.D., Officier d'instruction publique, France; Consulting Physician to the Pennsylvania Training School for Feeble-minded Children. 1319 Locust St.

1909. L'Engle, Edward M., M.D. Jacksonville, Fla.

1915. Lewis, Fielding O., M.D., Associate in Laryngology in the Jefferson Medical College Hospital; Operating Clinical Chief of the Laryngological Dispensary and Clinical Assistant of the Otological Dispensary of the Jefferson Medical College Hospital; Laryngologist of the Philadelphia General Hospital. 261 S. Seventeenth St.

1877. Lewis, Morris J., M.D., Attending Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases and Emeritus Physician to the Pennsylvania Hospital. 1316 Locust St.

1911. Lewis, Paul A., M.D., Director of the Pathological Department of the Henry Phipps Institute of the University of Pennsylvania; Assistant Professor of Pathology in the University of Pennsylvania. Henry Phipps Institute. Seventh and Lombard Streets.

1904. Lindauer, Eugene, M.D., Instructor of Neurology in the Medico-Chirurgical Hospital; Associate in Clinical Medicine in the Philadelphia Polyclinic; Assistant Neurologist to the Philadelphia General Hospital. 2018 N. Thirty-second Street.

1886. Lloyd, J. Hendrie, A.M. (Princeton), M.D., Neurologist to the Philadelphia General Hospital, and to the Methodist Episcopal Hospital; Consulting Neurologist to the State Asylum for the Chronic Insane at Wernersville, and to the Pennsylvania Training School for Feeble-minded Children at Elwyn. 4057 Spruce St.

1907. Lodholz, Edward, M.D., Demonstrator of Physiology in the University of Pennsylvania. 1106 S. 52d St.

1893. Longaker, Daniel, M.D., Obstetrician to the Kensington Hospital for Women and Visiting Obstetrician to the Jewish Maternity Hospital. 1402 N. Sixteenth St.

1907. Loux, Hiram R., M.D., Professor of Genito-vrinary Surgery in the Jefferson Medical College; Surgeon to the Philadelphia General Hospital. Medical Arts Building, Sixteenth and Walnut Sts.

1914. Lyon, B. B. Vincent, A.B. (Williams Coll.), M.D. 1901 Pine St.

ELECTED

1900. McCarthy, Daniel J., M.D., Professor of Medical Jurisprudence (George B. Wood Foundation) in the University of Pennsylvania; Neurologist to the Philadelphia General and St. Agnes' Hospitals, and to the Henry Phipps Institute. 2025 Walnut St.

*1903. McConnell, Guthrie, M.D., Director of the Clinical Laboratory of the Waterloo Medical Society; Deputy State Bacteriologist for Waterloo. New Haven, Conn.

1913. McCrae, Thomas, B.A., M.D., F.R.C.P. (Lond.), Professor of Medicine in the Jefferson Medical College; Physician to the Jefferson and Pennsylvania Hospitals. 1627 Spruce Street.

1895. McFarland, Joseph, M.D., Sc.D., Professor of Pathology and Bacteriology in the Medical Department of the University of Pennsylvania; Pathologist to the Philadelphia General Hospital. 442 W. Stafford St., Germantown.

1913. McGlinn, John A., B.A., M.D., Assistant Professor of Obstetrics in the Medico-Chirurgical College; Assistant Obstetrician to the Medico-Chirurgical Hospital; Gynecologist to St. Agnes' Hospital. 113 S. Twentieth St.

1905. McKenzie, Robert Tait, A.B., M.D., Professor of Physical Education and Director of the Department of Physical Education in the University of Pennsylvania. 2014 Pine St.

1916. McKnight, Howard A., A.B., M.D., Surgeon of Out-patient Department, St. Mary's Hospital; Assistant Surgeon of Out-patient Department, Polyclinic Hospital. 241 S. Thirteenth St.

1915. McLean, John D., M.D. 1538 S. Broad St.

*1900. McReynolds, Robert Phillips, M.D. 213 S. Broadway, Los Angeles, Cal.

1886. MacCoy, Alexander W., M.D. Consulting Laryngologist to the Bryn Mawr Hospital. 1503 Locust St.

1910. Mackinney, William H., M.D., Assistant Surgeon to the Dispensary for Genito-urinary Diseases, University Hospital; Assistant in the Urological Dispensary of the Lankenau Hospital. 1701 Chestnut St.

1914. Maier, F. Hurst, M.D., Associate in Gynecology to the Jefferson Medical College; Gynecologist to St. Joseph's Hospital. 2035 Chestnut St.

1913. Major, C. Percy, M.D., Physician to the Dispensary of the Germantown Hospital; Pediatrist to the Dispensary of the Germantown Hospital; Pediatrist to the Abington Memorial Hospital. Tenth and Oak Lane.

ELECTED

1913. Manges, Willis F., M.D., Roentgenologist to the Jefferson Hospital; Director of the Roentgen Ray Laboratory in the Philadelphia General Hospital. 264 S. Sixteenth St.

1898. Marshall, George Morley, M.D., Laryngologist to the Philadelphia General Hospital; Laryngologist and Otologist to St. Joseph's Hospital. 1819 Spruce St.

1889. Martin, Edward, M.D., John Rhea Barton Professor of Surgery in the University of Pennsylvania; Surgeon to the University, Howard, Philadelphia General, and Bryn Mawr Hospitals. 1506 Locust St.

*1868. Mears, J. Ewing, A.M., M.D., LL.D. 1535 Land Title Building, Broad and Sansom Sts.

*1911. Meigs, Edward Browning, A.B., M.D., Physiologist in the Dairy Division of the United States Department of Agriculture. 1445 Rhode Island Ave., N. W., Washington, D. C.

1914. Mencke, J. Bernhard, A.B., M.D., Assistant Surgeon to the Out-patient Department of the Lankenau Hospital; Assistant Surgeon to the Stetson Hospital. 908 N. Sixteenth Street.

1914. Merrill, Wm. Jackson, A.B., M.D., Instructor in Orthopædic Surgery, University of Pennsylvania; Assistant Orthopædic Surgeon, University Hospital; Orthopædic Surgeon to the Children's Hospital, Children's Seashore House and Howard Hospital; Consulting Orthopædic Surgeon to the Germantown Hospital. Medical Arts Building, Sixteenth and Walnut Sts.

*1894. Miller, D. J. Milton, M.D., Associate Physician to the Children's Hospital, Philadelphia; Pediatrist to the Bamberger Home for Invalid Children, Longport, N. J. N. W. Cor. Pacific and California Aves., Atlantic City, N. J.

1910. Miller, Morris Booth, M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Douglass Memorial Hospital; Assistant Surgeon to the Philadelphia General Hospital. 2117 Pine St.

1881. Mills, Charles K., M.D., LL.D., Emeritus Professor of Neurology in University of Pennsylvania; Neurologist to Philadelphia General Hospital; Consulting Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1909 Chestnut Street.

1917. Mitchell, A. Graeme, M.D. 1805 Pine St.

1904. Mitchell, Charles F., M.D., Surgeon to the Germantown, Bryn Mawr, and Chestnut Hill Hospitals, and to the Out-

ELECTED

patient Department of the Pennsylvania Hospital. 342 S. Fifteenth St.

1908. Montgomery, Charles M., A.B., M.D., Instructor in the Henry Phipps Institute (University of Pennsylvania); Physician to the Dispensaries of the Pennsylvania and St. Agnes' Hospitals. 2210 Locust St.

1882. Montgomery, Edward E., A.M., M.D., LL.D., Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Jefferson Medical College Hospital and to St. Joseph's Hospital. 1426 Spruce St.

1918. Morgan, Arthur C.

1886. Morris, Caspar, M.D. 2050 Locust St.

1893. Morris, Elliston J., M.D., Physician to the Episcopal Hospital and to the Midnight Mission. 128 S. Eighteenth St.

1883. Morris, Henry, M.D., Professor of Anatomy in the Woman's Medical College of Pennsylvania; Senior Visiting Physician to St. Joseph's Hospital. 313 S. Sixteenth St.

°1856. Morris, J. Cheston, M.D. 1514 Spruce St.

1906. Morrison, William H., M.D. 8021 Frankford Ave.

1897. Morton, Samuel W., M.D. 1926 Chestnut St.

1905. Müller, George P., M.D., Associate in Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Professor of Surgery in the Philadelphia Polyclinic; Surgeon to St. Agnes' Hospital; Consulting Surgeon to the Chester County Hospital. 1729 Pine St.

1915. Musser, John H., Jr., B.S., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia General Hospital; Physician-in-Charge, Medical Dispensary, University Hospital; Dispensary Chief and Assistant in the Presbyterian Hospital. 121 S. Twentieth Street.

1905. Mutschler, Louis H., M.D., Surgeon to the Episcopal Hospital; Assistant Surgeon to the Orthopædic Hospital. 1625 Spruce St.

*1896. Myers, T. D., M.D. P. O. Box 314, Pasadena, Cal.

1902. Nassau, Charles F., M.D., LL.D., Assistant Professor of Surgery in the Jefferson Medical College; Surgeon to St. Joseph's Hospital; Chief Surgeon to the Frankford Hospital; Assistant Surgeon to the Jefferson Medical College Hospital. 1515 Wallace St.

1886. Neff, Joseph S., A.M., M.D., LL.D., D.P.H. The Blenheim, Seventeenth and Chestnut Streets. Narberth, Pa.

ELECTED

1887. Neilson, Thomas Rundle, A.M., M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Professor of Genito-urinary Surgery in the University of Pennsylvania. 1937 Chestnut St.

1905. Newcomet, William S., M.D. 3501 Baring St.

1905. Newlin, Arthur, B.S., M.D., Physician to the Pennsylvania Hospital; Physician to the Dispensary of the Children's Hospital; Assistant Physician to the Orthopædic Hospital. 1804 Pine St.

1899. Nicholson, William Rufus, A.B., M.D., Gynecologist to the Polyclinic and Methodist Episcopal Hospitals; Obstetrician to the Presbyterian Hospital; Associate in Obstetrics in the University of Pennsylvania. 1731 Pine St.

*1889. Noble, Charles P., M.D. Easton, Md.

1905. Norris, Charles C., M.D., Instructor in Gynecology in the University of Pennsylvania; Physician to the Maternity Hospital; Consultant Gynecologist and Obstetrician to the Henry Phipps Institute of the University of Pennsylvania; Assistant Gynecologist to University Hospital. Coronado, 22d and Chestnut Sts.

1905. Norris, George William, A.B., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Physician to the Pennsylvania Hospital; Assistant Physician to the University Hospital. 1530 Locust St.

*1901. Norris, Henry, M.D., Surgeon to the Rutherford Hospital. Rutherfordton, N. C.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics in the University of Pennsylvania; Obstetrician in Charge of the Preston Retreat; Visiting Obstetrician to the Philadelphia General Hospital; Gynecologist to the Methodist Episcopal Hospital, and Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital. 500 N. Twentieth St.

1913. O'Neal, Alexander H., A.B., A.M., M.D., Physician to the Cathcart and Richardson Homes, Devon; Anesthetizer to the Bryn Mawr Hospital. St. Davids, Pa.

°1885. Osler, Sir William, Bart., M.D., Regius Professor of Medicine in Oxford University, England. No. 7, Norham Gardens, Oxford, England.

1903. Ostheimer, Maurice, A.B., M.D., Associate in Pediatrics in the University of Pennsylvania; Visiting Physician to the Philadelphia Hospital for Contagious Diseases; Physician-

ELECTED

in-Charge of the Children's Dispensary and Assistant Visiting Pediatric Physician, University Hospital; Physician to the Medical Dispensary of the Children's Hospital. 2202 De Lancey Place.

1913. Outerbridge, George W., A.B., M.D., Instructor in Gynecology and in Surgical Pathology in the University of Pennsylvania; Assistant Gynecologist to the Methodist Hospital and Assistant Surgeon to the Gynecean Hospital. 2039 Chestnut St.

1915. Owen, Hubley R., M.D., Surgeon to the Philadelphia General Hospital; Assistant Surgeon to the Orthopædic Hospital; Chief Surgeon of the Bureaus of Police and Fire, Philadelphia. 2046 Pine St.

1897. Packard, Francis R., M.D., Surgeon to the Out-patient Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Laryngologist to the Children's Hospital of Philadelphia; Consulting Aurist to the Bryn Mawr Hospital. 304 S. Nineteenth St.

1898. Page, Henry F., M.D., Assistant Physician to the Lankenau Hospital and Physician to the Medical Dispensary of the same; Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania. 315 S. Sixteenth St.

1906. Pancoast, Henry K., M.D., Professor of Röntgenology in the University of Pennsylvania and Röntgenologist to the University Hospital. Wynnewood, Pa.

1909. Parish, Benjamin D., B.S., M.D., Assistant Instructor in Otology in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Diseases of the Ear, University Hospital; Aurist and Laryngologist to St. Agnes' Hospital. 7318 Bryan St., Mt. Airy, Philadelphia.

1899. Parke, William E., M.D., Consulting Obstetrician to the Episcopal Hospital; Associate Surgeon to the Kensington Hospital for Women; Gynecologist to the Frankford Hospital. 1739 N. Seventeenth St.

1910. Patterson, Ross Vernet, M.D., Dean, Jefferson Medical College; Assistant Professor of Medicine in the Jefferson Medical College; Physician to the Philadelphia Hospital; Assistant Physician to the Jefferson Hospital. 340 S. Sixteenth St.

1903. Pearce, Richard M., M.D., Sc.D., Professor of Research Medicine in the University of Pennsylvania. 2114 De Lancey Place.

ELECTED

1909. Pemberton, Ralph, M.S., M.D., Visiting Physician to the Presbyterian Hospital; Director of the Department of Clinical Chemistry in the Pathological Laboratory of the Presbyterian Hospital. 2224 Locust St.

†1889. Penrose, Charles Bingham, M.D., Ph.D. (Harvard), Formerly Professor of Gynecology in the University of Pennsylvania. 1720 Spruce St.

1914. Pepper, O. H. Perry, B.S. (Univ. of Penna.), M.D. 1811 Spruce St.

†1902. Pepper, William, M.D., Dean of the School of Medicine, and Assistant Professor of Clinical Pathology in the University of Pennsylvania; Physician to the Philadelphia General Hospital; Assistant Physician to the University Hospital. 1811 Spruce St.

1916. Percival, Milton Fraser, M.D. 2332 S. Broad St.

1917. Peter, Luther C., M.D., Professor of Ophthalmology in the Medical Department of Temple University; Ophthalmologist to the Polyclinic Section of the University of Pennsylvania; Ophthalmologic Surgeon to the Samaritan and Garretson Hospitals, the Friends' Hospital for Mental and Nervous Diseases and the Rush Hospital for Consumption and Allied Diseases. 1527 Spruce St.

1912. Petty, Orlando H., B.S., A.M., M.D., Instructor in Medicine in the Jefferson Medical College; Pathologist and Assistant Physician to St. Timothy's Hospital; Physician to the Kensington Dispensary for the Treatment of Tuberculosis. 6215 Ridge Ave.

1905. Pfahler, George E., M.D., Professor of Roentgenology in the Medico-Chirurgical Post-Graduate School of Medicine of the University of Pennsylvania; Director of the *X*-ray Laboratories at the Howard Hospital, Polyclinic Hospital and the Misericordia Hospital. 1321 Spruce St.

1915. Pfeiffer, Damon B., A.B., M.D., Instructor in Surgery, University of Pennsylvania; Assistant Surgeon, University Hospital; Pathologist to the Lankenau Hospital; Director of the Clinical Laboratory, Presbyterian Hospital. 2028 Pine St.

1907. Pfromm, George W., Ph.G., M.D., Assistant Physician to the American Stomach Hospital; Consulting Physician to the German Protestant Home for the Aged. 1431 N. Fifteenth St.

ELECTED

1907. Phillips, Horace, M.D., Second Assistant Physician to the Pennsylvania Hospital for the Insane; Visiting Physician to the Eastern Penitentiary of Pennsylvania. 905 Land Title Building.

1883. Piersol, George A., M.D., Sc.D., Professor of Anatomy in the University of Pennsylvania. 4724 Chester Ave.

1911. Piersol, George Morris, B.S., M.D., Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania; Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia General Hospital; Assistant Physician to the University Hospital. 1913 Spruce St.

1917. Piper, Edmund Brown, M.D. 6071 Drexel Road, Overbrook, Pa.

1905. Pitfield, Robert L., M.D., Pathologist to the Germantown Hospital; Bacteriologist to the Chestnut Hill Hospital for Lung Diseases. 5211 Wayne Ave.

1896. Posey, William Campbell, M.D., Surgeon to the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Howard Hospital; Ophthalmologist to the Pennsylvania Hospital for Epileptics. 2049 Chestnut St.

1899. Potts, Charles S., M.D., Neurologist to the Philadelphia General Hospital; Consultant to the Insane Department of the Philadelphia General Hospital; Consulting Neurologist, Lankenau Hospital; Consultant to the Hospital for the Insane, Atlantic County, New Jersey. 2018 Chestnut St.

1907. Price, George E., M.D., Associate Professor of Nervous and Mental Diseases in the Jefferson Medical College; Neurologist to the Philadelphia General Hospital. 1830 S. Rittenhouse Square.

†1903. Pyle, Walter L., A.M., M.D., Assistant Surgeon to the Wills Eye Hospital. 1931 Chestnut St.

1908. Radcliffe, McCluney, A.M. (Lafayette), M.D., LL.D., Ophthalmic Surgeon to the Presbyterian Hospital; Attending Surgeon to the Wills Eye Hospital. 1906 Chestnut St.

1913. Randall, Alexander, A.M., M.D., Assistant Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon in the Genito-Urinary Dispensary of the University of Pennsylvania. Professional Building, Room 401.

ELECTED

1887. Randall, B. Alexander, M.A., M.D., Professor of Otology in the University of Pennsylvania; Ear Surgeon to the Children's Hospital; Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, and to St. Timothy's Hospital. 1717 Locust St.

*1904. Ravenel, Mazyck P., M.D., Professor of Preventive Medicine and Bacteriology and Director of the Public Health Laboratory at the University of Missouri, Columbia, Mo.

1897. Rhein, John H. W., M.D., Professor of Diseases of the Mind and Nervous System in the Graduate School of Medicine, University of Pennsylvania; Neurologist to the Howard Hospital; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children. 1732 Pine St.

1906. Rhein, Robert D., M.D., Chief Physician to the Clinic of the American Hospital for Diseases of the Stomach; Physician to the Philadelphia Home for Incurables; Examining Physician to the White Haven Sanatorium. 2016 Pine Street.

1891. Rhoads, Edward G., M.D. 159 W. Coulter St., Germantown.

*1910. Rhoads, Samuel, M.D. Pasadena, California.

1898. Riesman, David, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to the Philadelphia General and Polyclinic Hospitals. 1715 Spruce Street.

1895. Ring, G. Oram, A.M., M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmologist to the Widener Memorial Home for Crippled Children; Consulting Ophthalmologist to the American Oncologic Hospital. N. E. Cor. Seventeenth and Walnut Sts.

*1905. Risley, J. Norman, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Training School for Feeble-minded Children. New Bedford, Mass.

1891. Risley, Samuel D., A.M., LL.D., M.D., Ph.D., Consulting Surgeon to the Wills Eye Hospital; Professor (Emeritus) of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Alumnus Manager of the University Hospital. 2018 Chestnut St.

†1878. Roberts, John B., M.D., Professor of Surgery in the University of Pennsylvania Graduate School of Medicine. 313 S. Seventeenth St.

ELECTED

1899. Roberts, Walter, M.D., Professor of Otology in the Philadelphia Polyclinic; Otologist to the Methodist Episcopal Hospital; Laryngologist to the Philadelphia General Hospital. 1732 Spruce St.

1903. Robertson, William Egbert, M.D., Professor of Theory and Practice of Medicine and of Clinical Medicine in Temple University; Physician to the Episcopal, Samaritan, and Garretson Hospitals. 327 S. Seventeenth St.

1902. Robinson, James Weir, M.D., Assistant Surgeon to the Presbyterian Hospital. 326 S. Sixteenth St.

1903. Robinson, William Duffield, Ph.G., M.D. 2012 Mount Vernon St.

1912. Rodman, John Stewart, M.D., Lecturer on Surgery in the Medico-Chirurgical College; Assistant Surgeon to the Medico-Chirurgical Hospital; Surgeon to the Dispensary of the Presbyterian Hospital; Assistant Surgeon to the Out-patient Department of the Pennsylvania Hospital. 310 Real Estate Building.

1909. Rosenberger, Randle C., M.D., Professor of Hygiene and Bacteriology in the Jefferson Medical College; Professor of Hygiene and Preventive Medicine in the Woman's Medical College of Pennsylvania; Director of the Clinical Laboratory of the Philadelphia General Hospital. 2330 N. Thirteenth St.

1898. Ross, George G., M.D., Assistant Surgeon to the Lankenau Hospital and Surgeon to the Out-patient Department of the same; Surgeon to the Germantown Hospital; Surgeon to the Stetson Hospital; Instructor in Surgery in the University of Pennsylvania. 1721 Spruce St.

*1907. Royer, B. Franklin, M.D. Donaldson Bldg., Harrisburg, Pa.

†1905. Rugh, James Torrance, A.B., M.D., Clinical Professor of Orthopedic Surgery in the Woman's Medical College of Pennsylvania; Orthopedic Surgeon to the Jefferson Medical College; Orthopedic Surgeon to the Methodist and the Philadelphia General Hospitals. 1616 Spruce St.

1897. Sailer, Joseph, Ph.B., M.D., Professor of Clinical Medicine in University of Pennsylvania; Physician to the Philadelphia General, the University, and Presbyterian Hospitals. 1718 Spruce St.

ELECTED

1900. Sajous, Charles E. de M., M.D., B.Lett., LL.D., Knight of the Legion of Honor, and Officer of the Academy of France; Corresponding Member of the Society of Public Medicine of Belgium. 2043 Walnut St.

1905. Sartain, Paul J., A.M., M.D. 2006 Walnut St.

1908. Sautter, Albert C., M.D., Assistant in the Dispensary for Diseases of the Eye in the University Hospital; Assistant in the Eye Dispensary of the Lankenau Hospital. 1421 Locust St.

1906. Saylor, Edwin S., M.D., Chief Ophthalmic Surgeon to the Charity Hospital of Philadelphia, and to the Department Eye and Ear, American Hospital for Diseases of the Stomach. 2005 Chestnut St.

*1910. Scarlet, Rufus B., M.D., Laryngologist to the Home for Consumptives at Chestnut Hill; Assistant in the Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Instructor in Diseases of the Nose and Throat in the Philadelphia Polyclinic and College for Graduates in Medicine. 78 N. Clinton Ave., Trenton, N.J.

1917. Schaeffer, Jacob Parsons, A.M., M.D., Ph.D., Professor of General Anatomy and Director of the Daniel Baugh Institute of Anatomy of the Jefferson Medical College. 4634 Spruce St.

1899. Schamberg, Jay F., M.D., Professor of Dermatology and Syphilology, Jefferson Medical College; Professor of Dermatology and Infectious Eruptive Diseases, Graduate School, University of Pennsylvania. 1922 Spruce St.

1917. Schnabel, Trueman Gross, M.D. 224 Sedgwick St.

1917. Schoff, Charles H., M.D. Media, Pa.

1887. de Schweinitz, George Edmund, A.M., M.D., LL.D., Professor of Ophthalmology in the University of Pennsylvania; Consulting Ophthalmic Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases; The Philadelphia Polyclinic and School for Graduates in Medicine, and the Philadelphia General Hospital; Ophthalmic Surgeon to the University Hospital. 1705 Walnut St.

*1913. de Schweinitz, George Lord, B.S., M.D., Assistant in the Department of Ophthalmology, St. Luke's Hospital, Bethlehem, Pa. 169 East Broad St., Bethlehem, Pa.

1910. Schwenk, Peter N. K., M.A., M.D., Attending Surgeon to the Eye Department of the Pennsylvania Hospital; Attending Surgeon to the Wills Eye Hospital. 1417 N. Broad Street.

ELECTED

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 255 S. Seventeenth St.

1917. Service, Charles A., M.D. Bala, Pa.

1908. Shannon, Charles E. G., A.B., M.D., Instructor in Ophthalmology in the Jefferson Medical College; Assistant in the Ophthalmological Clinic at the Jefferson Medical College Hospital; Ophthalmologist to the Seybert Institution. 1633 Spruce St.

1897. Sharpless, William T., M.D., Physician to the Chester County Hospital. West Chester, Pa.

1906. Shields, William G., M.D., Dermatologist to Germantown Hospital; Chief of Dermatological Clinic and Assistant Physician to the Jewish Hospital. 414 School Lane, Germantown.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Presbyterian Hospital and to the Pennsylvania Epileptic Hospital and Colony Farm. 1906 Chestnut St.

*1908. Shoemaker, Harlan, A.B., M.D., Lecturer in Surgery, University of Southern California, Surgeon to Los Angeles County Hospital, Surgeon to Washington Street Clinic. 621 Marsh Strong Building, Los Angeles, Cal.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms; Consulting Physician to the Southern Home for Destitute Children; Assistant Physician to the Lankenau Hospital; Physician to the Out-patient Department of the Lankenau Hospital. N. W. Cor. 20th and Chestnut Sts.

†1896. Shoemaker, William T., M.D., Associate Clinical Professor of Ophthalmology in the Woman's Medical College of Pennsylvania; Ophthalmic Surgeon to the Germantown and Lankenau Hospitals; Attending Surgeon to the Eye Department of the Pennsylvania Hospital; Consulting Ophthalmologist to the Pennsylvania Institution for the Deaf and Dumb, and to the Southern Home for Destitute Children. 109 S. Twentieth St.

1900. Shumway, Edward Adams, B.S., M.D., Ophthalmic Surgeon to the Philadelphia General Hospital; Ophthalmic Surgeon to the Children's Hospital; Instructor in Ophthalmology in the University of Pennsylvania, and Assistant Ophthalmic Surgeon to the University Hospital; Ophthalmic Surgeon to the Lankenau Hospital. 2046 Chestnut St.

ELECTED

1903. Sinclair, John Falconer, M.D., Physician to the Medical Dispensary of the Presbyterian Hospital; Physician to the Philadelphia Orphan Asylum and to the Presbyterian Orphanage; Physician to the Home of the Merciful Saviour for Crippled Children. 4103 Walnut St.

1907. Sinkler, Francis Wharton, A.B., M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Physician to the Episcopal Hospital. 1606 Walnut St.

1902. Siter, E. Hollingsworth, M.D., Instructor in Genito-urinary Diseases in the University of Pennsylvania; Genito-urinary Surgeon to the Philadelphia General Hospital; Surgeon-in-Charge of the Genito-urinary Dispensary of the University Hospital; Consulting Genito-urinary Surgeon to the Eastern Penitentiary, and to the Philadelphia County Prison. 1818 S. Rittenhouse Square.

1904. Skillern, Penn-Gaskell, M.D. 241 S. Thirteenth St.

1904. Smith, Allen J., A.M., M.D., Sc.D. (Penna. Coll.), LL.D. (McGill Univ.), Professor of Pathology and of Comparative Pathology, and Director of Courses in Tropical Medicine in the University of Pennsylvania. Medical Laboratories, University of Pennsylvania.

1905. Smith, S. MacCuen, M.D., Professor of Otology in the Jefferson Medical College; Aurist and Laryngologist to the Germantown Hospital; Aurist to the Jewish Hospital; Consulting Aurist to the Oncologic Hospital. 1429 Spruce St.

1908. Speese, John, M.D., Instructor in Surgery and Surgical Pathology in the University of Pennsylvania; Associate in Surgery in the Philadelphia Polyclinic; Surgeon to the Children's Hospital; Assistant Surgeon to the Presbyterian and Polyclinic Hospitals. 2206 Locust St.

1895. Spellissy, Joseph M., A.M., M.D., Visiting Surgeon to St. Joseph's and to the Methodist Episcopal Hospitals; Assistant Surgeon to the Orthopedic Department of the University Hospital. 317 S. Fifteenth St.

1897. Spiller, William G., M.D., Professor of Neurology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania; Neurologist to the Philadelphia General Hospital; Consultant Neurologist to the Pennsylvania Hospital. 4409 Pine St.

1894. Stahl, B. Franklin, B.S., Ph.G., M.D., Clinical Professor of Medicine in the Woman's Medical College of Pennsyl-

ELECTED

vania; Associate in Medicine and Lecturer on Dietetics of the Sick in the University of Pennsylvania; Visiting Physician to St. Agnes' and the Philadelphia General Hospitals. 1727 Pine St.

1909. Starbuck, J. Clinton, M.D., Physician to the Orphanage, Orphan Society of Philadelphia at Wallingford and to the Glen Mills School, Glen Mills, Pa. 42 E. Washington St., Media, Pa.

*1875. Starr, Louis, M.D., LL.D. (Haverford). Care of Brown, Shipley & Co., London, England.

1912. Stauffer, Nathan Pennypacker, D.D.S., M.D., Laryngologist and Otologist to the Dispensary of the Presbyterian Hospital; to the Pennsylvania Hospital; to the Philadelphia General Hospital, Tubercular Department; to the Home for Crippled Children. 1819 Walnut St.

1910. Stellwagen, Thomas C., Jr., M.D., Chief Clinical Assistant in the Out-patient Surgical Department of the Jefferson Medical College Hospital. 200 Professional Bldg., 1831 Chestnut St.

1884. Stelwagon, Henry W., M.D., Ph.D., Professor of Dermatology in the Jefferson Medical College. 1634 Spruce St.

1895. Stengel, Alfred, M.D., Sc.D., Professor of Medicine in the University of Pennsylvania; Physician to the University Hospital and the Pennsylvania Hospital. 1728 Spruce Street.

1901. Stevens, Arthur A., M.D., Professor of Materia Medica, Therapeutics, and Clinical Medicine in the Woman's Medical College of Pennsylvania; Lecturer on Physical Diagnosis in the University of Pennsylvania; Physician to the Episcopal and St. Agnes' Hospitals. 314 S. Sixteenth St.

1902. Stewart, Francis T., M.D., Professor of Clinical Surgery in the Jefferson Medical College; Surgeon to the Germantown Hospital; Surgeon to the Pennsylvania Hospital. 311 S. Twelfth St.

1914. Stewart, Thomas S., B.S. (Univ. of Penna.), M.D. 301 S. Eighteenth St.

1898. Stout, George C., M.D., Professor of Otology in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist and Aurist to the Presbyterian Hospital, the Children's Aid Society, and the William Penn Charter School. 1611 Walnut St.

ELECTED

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital. 3833 Walnut St.

*1900. Swan, John M., M.D. 457 Park Avenue, Rochester, N. Y.

1898. Sweet, William M., M.D., Clinical Professor of Ophthalmology in the Jefferson Medical College, and Ophthalmic Surgeon to the Jefferson Medical College Hospital; Professor of Diseases of the Eye in the Philadelphia Polyclinic; Attending Surgeon to the Wills Eye Hospital. 1205 Spruce St.

1900. Talley, James Ely, A.B., M.D., Visiting Physician to the Presbyterian and Methodist Episcopal Hospitals; Consulting Physician to the Eastern Penitentiary. 4301 Spruce St.

1911. Taylor, Alonzo Englebert, M.D., Rush Professor of Physiological Chemistry in the University of Pennsylvania. 4522 Locust St.

1886. Taylor, John Madison, A.B. and A.M. (Princeton), M.D., Professor of Applied Therapeutics in the Temple University; Editor *Monthly Cyclopedia of Practical Medicine;* Consulting Physician to the Elwyn, Pa., and the Vineland, N. J., Training Schools for Feeble-minded Children. 1504 Pine St.

1887. Taylor, William J., M.D., Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to St. Agnes' Hospital; Consulting Surgeon to the West Philadelphia Hospital for Women. 1825 Pine St.

1886. Taylor, William L., M.D. 1340 N. Twelfth St.

†1910. Thomas, Benjamin A., A.B., A.M., M.D., Professor of Genito-urinary Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Head of the Department of Genito-urinary Surgery, Presbyterian Hospital; Instructor in Surgery in the University of Pennsylvania; Surgeon-in-Chief to the Out-patient Department of the University Hospital. 116 S. Nineteenth St.

1867. Thomas, Charles Hermon, M.D. 3634 Chestnut St.

1912. Thomas, Frank Wister, A.M., M.D., Visiting Physician to "Buttercup Cottage;" Consulting Physician to the Germantown Hospital. 27 E. Mt. Airy Ave.

1907. Thomas, Thomas Turner, M.D., Associate Professor of Applied Anatomy, and Associate in Surgery in the University of Pennsylvania; Surgeon to the Philadelphia General Hospital; Assistant Surgeon to the University Hospital. 2005 Chestnut St.

ELECTED

1896. Thorington, James, A.M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Presbyterian Hospital; Ophthalmologist to the Ellwyn, Pa., Training School for Feeble-minded Children. 2031 Chestnut St.

1898. Thornton, Edward Q., M.D., Assistant Professor of Materia Medica in the Jefferson Medical College. 1331 Pine St.

1912. Torrey, Robert G., M.D., Assistant Physician to the Philadelphia General Hospital; Physician to the State Tuberculosis Dispensary. 1716 Locust St.

1896. Toulmin, Harry, M.D. Haverford, Pa.

1908. Tracy, Stephen E., M.D., Gynecologist to the Stetson Hospital; Visiting Surgeon to the Gynecean Hospital. 1527 Spruce St.

1901. Tucker, Henry, M.D., Genito-urinary Surgeon to the Philadelphia General Hospital; Curator of the Academy of Natural Sciences of Philadelphia. 2000 Pine St.

†1894. Tunis, Joseph Price, M.D., Clinical Assistant to the Nose and Throat Dispensary of the Polyclinic Hospital. 2017 Locust St.

1901. Turner, John B., M.D. 1833 Chestnut St.

1866. Tyson, James, M.D., LL.D., Emeritus Professor of Medicine in the University of Pennsylvania and late Physician to the Hospital of the University of Pennsylvania, and to the Pennsylvania Hospital. 1506 Spruce St.

1897. Tyson, T. Mellor, M.D., Physician to the Philadelphia General Hospital; Physician to the Rush Hospital, the Philadelphia Lying-in-Charity Hospital, and the Children's Aid Society of Philadelphia. 1506 Spruce St.

1907. Ullom, Josephus Tucker, M.A., M.D., Member of the Staff of the Henry Phipps Institute, Visiting Physician to the Chestnut Hill Hospital. 24 Carpenter St., Germantown.

1913. Vail, William Penn., B.S., M.S., M.D., Laryngologist to the Pennsylvania Institution for the Instruction of the Blind; Laryngologist to the Department for Tuberculosis of the Philadelphia General Hospital; Assistant Laryngologist and Otologist to the Out-patient Department of the Pennsylvania Hospital; Assistant Laryngologist to the Children's Hospital. 1906 Sansom St.

ELECTED

°1873. Van Harlingen, Arthur, Ph.B. (Yale), M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic. 1831 Chestnut St.

1903. Van Pelt, William Turner, M.D. Consulting Ophthalmologist to the Episcopal Hospital. 1100 Widener Building.

1893. Vansant, Eugene Larue, M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Visiting Physician to the Throat, Nose, and Ear Department of the Howard Hospital. 1929 Chestnut St.

1912. Vaux, Norris Wistar, M.D., Surgeon to the Chestnut Hill Hospital; Surgeon to the Dispensary of the Germantown Hospital. 8901 Germantown Ave., Chestnut Hill.

*1897. Veasey, Clarence A., A.M., M.D. Suite 404, Paulsen Building, Spokane, Wash.

†1883. Vinton, Charles Harrod, A.M., M.D. P. O. Box 464, Atlantic City, N. J.

1903. Wadsworth, William Scott, M.D. 3914 Baltimore Ave.

1906. Walker, John K., M.D., Physician to the Children's Hospital of the Mary J. Drexel Home; Physician to the Out-patient Department of the Pennsylvania Hospital. 1915 Rittenhouse St.

1907. Walker, Warren, M.D., Dermatologist to the Episcopal and Howard Hospitals; Assistant Dermatologist to the Pennsylvania Hospital. 246 S. Twenty-second St.

1904. Walsh, Joseph, A.M., M.D., Visiting Physician to and Medical Director of the White Haven Sanatorium; Medical Director of St. Agnes' Hospital. 2026 Chestnut St.

1910. Ward, E. Tillson, A.M., M.D. 1415 S. Broad St.

1895. Watson, Arthur W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist to the Jewish Hospital; Laryngologist and Aurist to the Mt. Sinai Hospital; Laryngologist to Home for Incurables. 126 S. Eighteenth Street.

1886. Watson, Edward W., M.D., Physician to the Magdalene Home. 38 S. Nineteenth St.

1903. Weber, Charles H., M.D., Physician to the Dispensary of the Children's Hospital. 2048 Pine St.

1906. Weisenburg, Theodore H., M.D., Professor of Neurology, Graduate School, University of Pennsylvania; Neurologist to the Philadelphia Hospital, Municipal Hospital, etc. 1909 Chestnut St.

ELECTED

1883. Welch, William M., M.D., Chief Diagnostician to the Bureau of Health, and Consulting Physician to the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary and the Northern Home for Friendless Children. 1411 Jefferson St.

1913. Wells, P. Frailey, A.M., M.D., Ph.D. S. W. Cor. Fortieth and Brown Sts.

1897. Wells, William H., M.D., Assistant Professor of Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Medical College Hospital; Pediatrician to the Willing Day Nursery; Pediatrician to the Charity Hospital. 1135 Spruce St.

1893. Westcott, Thompson S., M.D., Associate in Diseases of Children in the University of Pennsylvania; Pediatrist to the Methodist Episcopal Hospital; Consulting Physician, Haddock Memorial Home. 1720 Pine St.

1884. Wharton, Henry R., M.D., Surgeon to the Presbyterian and the Children's Hospitals; Surgeon to Girard College; Consulting Surgeon to the Bryn Mawr Hospital, the Chestnut Hill Hospital, St. Christopher's Hospital for Children, the Pennsylvania Institution for the Deaf and Dumb, and the Pennsylvania Institution for the Blind. 1725 Spruce Street.

1901. White, Courtland Y., M.D., Director of the Pathological Laboratories of the Episcopal Hospital; Pathologist to the Children's Hospital and to the Kensington Hospital for Women; Chief Bacteriologist to the Bureau of Health, Department of Health and Charities, Philadelphia. 1808 Diamond St.

1905. Whiteway, Harold M., M.D. 1924 Chestnut St.

1898. Whiting, Albert D., M.D., Surgeon to the Germantown Hospital; Assistant Surgeon to the Lankenau Hospital; Assistant Surgeon to the University Hospital; Instructor in Surgery in the University of Pennsylvania. 1523 Spruce Street.

1914. Willard, de Forest P., B.S. (Univ. of Penna.), M.D. 1933 Chestnut St.

1907. Williams, Carl, B.S., M.D., Ophthalmic Surgeon to the Germantown Hospital; Instructor in Ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon to the Pennsylvania Institution for the Deaf and Dumb. School Lane and Greene Sts., Germantown.

ELECTED

1915. Willits, Charles H., A.M., M.D., Medical Director of the Provident Life and Trust Company. 409 Chestnut St.

1916. Wilmer, Harry B., M.D., Assistant Instructor in Medicine, University of Pennsylvania; Assistant Visiting Physician and Assistant Neurologist to the Germantown Hospital; Visiting Chief to the Dispensary of the Germantown Hospital. 138 W. Walnut Lane, Germantown.

1881. Wilson, H. Augustus, M.D., Emeritus Professor of Orthopedic Surgery in the Jefferson Medical College; Consulting Orthopedic Surgeon to the Philadelphia Lying-in Charity Hospital and the Kensington Hospital for Women. 1611 Spruce St.

1874. Wilson, James Cornelius, A.M. (Princeton), M.D., Emeritus Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College; Physician-in-Chief to the Lankenau Hospital; Emeritus Physician to the Pennsylvania Hospital; Consulting Physician to the Bryn Mawr Hospital. 1509 Walnut St.

1902. Wilson, Samuel M., M.D. 1517 Arch St.

1897. Wilson,W. Reynolds, M.D. 1709 Spruce St.

1904. Wister, James W., M.D., Physician to the Out-patient Department of the Germantown Hospital. 5430 Germantown Ave.

*1901. Witmer, A. Ferree, M.D. Freeport, Long Island, N. Y.

1918. Wolferth, Charles Christian.

1893. Wood, Alfred C., M.D., Assistant Professor of Surgery in the University of Pennsylvania; Surgeon to the University, the Philadelphia General, St. Timothy's, and the Howard Hospitals. 2035 Walnut St.

1900. Wood, George B., M.D., Instructor in Laryngology in the University of Pennsylvania; Assistant in the Clinic for Diseases of the Nose and Throat at the Polyclinic Hospital. Bryn Mawr, Pa.

1865. Wood, Horatio C, M.D., LL.D (Yale, Lafayette and University of Pennsylvania), M. N. A. S., Emeritus Professor of Materia Medica and Therapeutics in the University of Pennsylvania. 4107 Chester Ave.

1903. Wood, Horatio C., Jr., M.D., Professor of Pharmacology and Therapeutics in the University of Pennsylvania. 1905 Chestnut St.

1880. Woodbury, Frank, M.D., Secretary to the Committee on Lunacy of the Board of Charities of Pennsylvania. 218 S. Sixteenth St.

ELECTED

*1911. Woods, Andrew H., A.B., M.D. Cedar Rapids, Iowa.

†1897. Woodward, George, M.D. W. Willow Grove Ave., Chestnut Hill, Philadelphia.

1913. Woodward, W. Wellington, M.D. 26 S. Church St., West Chester, Pa.

1903. Worden, Charles B., M.D., Medical Director Wanamaker Stores. 322 S. Sixteenth St.

1889. Young, James K., M.D., Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopedic Surgery in the Woman's Medical College of Pennsylvania; Associate Professor of Orthopedic Surgery in the University of Pennsylvania. 222 S. Sixteenth St.

1894. Zentmayer, William, M.D., Professor of Ophthalmology Graduate School of Medicine, University of Pennsylvania; Attending Surgeon to the Wills Eye Hospital; Ophthalmologist to the Glen Mills School. 1506 Spruce St.

1899. Ziegler, S. Lewis, A.M., M.D., LL.D., Attending Surgeon to the Wills Eye Hospital; Chief Ophthalmic Surgeon to St. Joseph's Hospital; Membre Société Française d'Ophthalmologie; Director of Public Health and Charities of Philadelphia. 1625 Walnut St.

1887. Ziegler, Walter M. L., A.M., M.D. 1418 N. Seventeenth St.

1895. Zimmerman, Mason W., M.D., Consulting Ophthalmic Surgeon to the Germantown Hospital. 1522 Locust St.

# ASSOCIATE FELLOWS

(Limited to Fifty, of whom Twenty may be Foreigners)

## American

ELECTED

1911. Abbe, Robert, M.D. 13 W. Fiftieth St., New York City, N. Y.

1909. Billings, Frank, M.D., 122 S. Michigan Boulevard, Chicago, Illinois.

1893. Councilman, William T., M.D., Harvard Medical College, Boston, Massachusetts.

1909. Crile, George W., M.D., 1021 Prospect Avenue, S. E., Cleveland, Ohio.

1909. Dana, Charles Loomis, M.D., 53 West Fifty-third Street, New York City, New York.

1892. Emmet, Thomas Addis, M.D., 91 Madison Avenue, New York City, New York.

1903. Gorgas, William C., M.D., U. S. A., Washington, D. C.

1891. Jacobi, A., M.D., 19 East Forty-seventh Street, New York City, New York.

1912. McCaw, Lieut. Col. Walter D., M.D. Care of Surgeon-General's Office, Washington, D. C.

1909. Mall, Franklin P., M.D., 1514 Bolton Street, Baltimore, Maryland.

1906. Mayo, William J., M.D., Rochester, Minnesota.

1906. Pilcher, Lewis Stephen, M.D., 145 Gates Avenue, Brooklyn, New York.

1886. Reeve, John C., M.D., LL.D., S. W. corner Third and Wilkinson Streets, Dayton, Ohio.

1906. Shattuck, Frederick C., M.D., 135 Marlborough Street, Boston, Massachusetts.

1894. Warren, J. Collins, M.D., 58 Beacon Street, Boston, Massachusetts.

1894. Weir, Robert F., M.D., 11 East Fifty-fourth Street, New York City, New York.
1892. Welch, William H., M.D., Johns Hopkins Hospital, Baltimore, Maryland.

## Foreign

1890. Baccelli, Guido, Rome, Italy.
1908. Bannerman, W. B., M.D., General, I. M. S., 11 Strathearn Place, Edinburgh, Scotland.
1899. Fraser, Sir Thomas R., M.D., LL.D., F.R.C.P., F.R.S., 13 Drumsheigh-Gardens, Edinburgh, Scotland.
1909. Macallum, Archibald B., M.A., M.B., Ph.D., Sc.D., LL.D., F.R.S., 59 St. George Street, Toronto, Canada.
1906. Myles, Sir Thomas, M.D., 33 Merion Square, W., Dublin, Ireland.
1898. Roddick, Thomas G., M.D., 80 Union Avenue, Montreal, Canada.
1908. Ross, Major Ronald, M.D., R.A., Liverpool School of Tropical Medicine, Liverpool, England.
1869. de Valcourt, Th., M.D., M.R.C. Phys., London. 64 rue de Drony, Paris, 17$^{e}$ France.

# CORRESPONDING MEMBERS

1880. Carrow, Flemming, M.D., 823 David Whitney Building, Detroit, Mich.
1885. Rendu, Jean, M.D., Lyons, France.
1915. McIntire, Charles, M.D., Easton, Pennsylvania.
1916. Estes, William Lawrence, M.D., South Bethlehem, Pa.
1916. Guitéras, John, M.D., Havana, Cuba.
1917. Miner, Charles H., M.D., Wilkes-Barre, Pa.
1917. Stevens, Cyrus L., M.D., Athens, Pa.

## NECROLOGICAL LIST

FELLOWS

| | |
|---|---|
| THOMAS J. MAYS, M.D., | February 14, 1918 |
| SAMUEL G. DIXON, M.D., | February 26, 1918 |
| HENRY C. WELKER, M.D., | May 2, 1918 |
| W. CONSTANTINE GOODELL, M.D., | May 14, 1918 |
| GWILYM G. DAVIS, M.D., | June 16, 1918 |
| ALFRED REGINALD ALLEN, M.D., | September 30, 1918 |
| ISAAC NORRIS, M.D., | October 22, 1918 |

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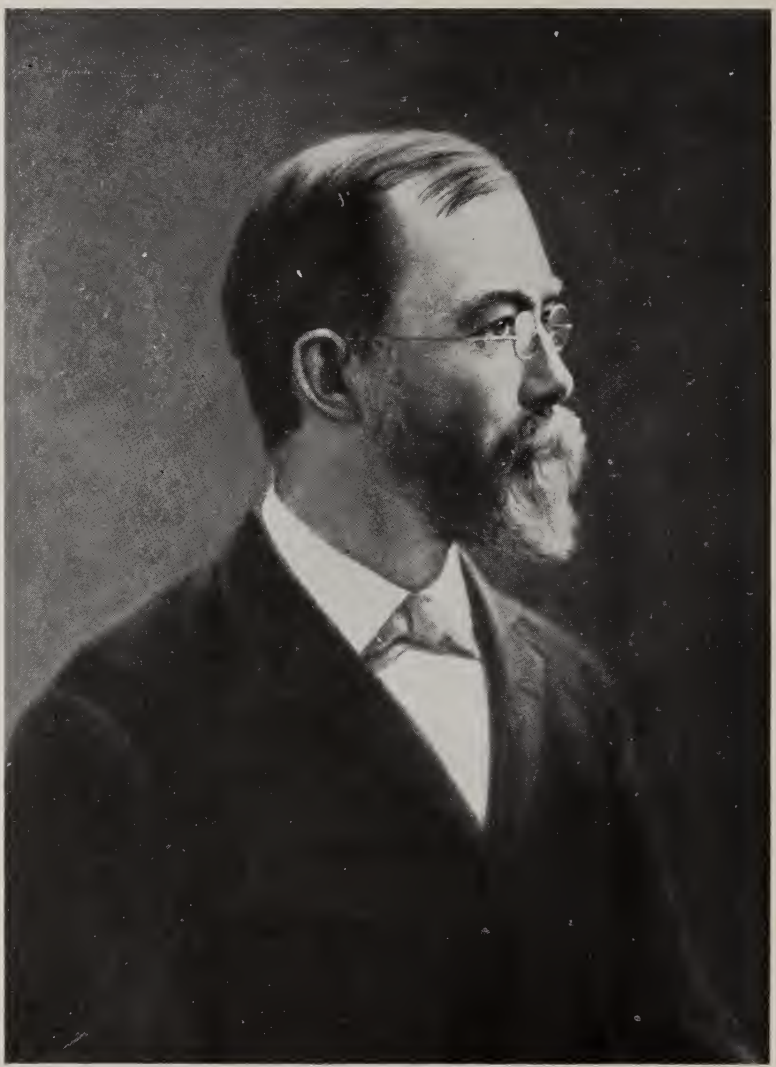

DR. HARRISON ALLEN

# REMARKS ON PRESENTATION OF A PORTRAIT OF DR. HARRISON ALLEN[1]

By GEORGE A. PIERSOL, M.D.

In these days, when the desirability, nay the necessity, of some acquaintance with the natural sciences is universally recognized as an important part of the preparation for the study of medicine, it is of interest to trace the development of the appreciation of these cognate sciences in the oldest medical school in this country. Naturally, botany early claimed attention and in the first faculty of medicine in the University of Pennsylvania provision was made for instruction in this subject. Three years later, in 1768, further recognition was accorded this branch by the election of Dr. Adam Kuhn as professor of botany and materia medica.

But the importance of those phases of biological study dealing with the animal world steadily gained in appreciation on the part of those who were anxious to afford the medical student the opportunity of gaining a more adequate conception of the relation of man to animal life. The formal attempt to promote these aims was the establishment of a Faculty of Natural Science in 1816. This faculty comprised a professor of botany, one of natural history, including zoölogy and geology, one of comparative anatomy and one of mineralogy and chemistry.

This provision for instruction designed to widen the mental horizon of the student excited but feeble interest among those for whom it was particularly established, notwithstanding the cordial

[1] Read March 6, 1918.

support of members of the medical faculty, especially Dr. Caspar Wistar. Not being required for the degree in medicine, the branches taught by the Faculty of Natural Science were regarded by many as superfluous luxuries and claimed little attention by students concerned more with securing the right to practice than in laying a broad foundation for their professional education.

However, the belief in the value of biology as a collateral science was strong and enduring among those of clearer vision. Encouraged by the sympathetic interest of Dr. Joseph Leidy, Dr. George B. Wood, then emeritus professor of the theory and practice of medicine, made possible the revival of lectures on the natural sciences as supplementary to the medical course. In 1865 the trustees declared: "The instruction as at present given in the medical department of the University does not embrace all branches of knowledge specially subservient to medicine or closely connected with it," and established the Auxiliary Faculty of Medicine, consisting of five professorships. Of these chairs the first mentioned was that of zoölogy and comparative anatomy, and as its first incumbent was chosen Dr. Harrison Allen.

Dr. Allen's interest in natural history, awakened while he was in the High School of Philadelphia, rapidly grew during his student days at the University of Pennsylvania, until the investigation of animate nature became the dominating influence of his life. This bent toward the more scientific aspects of medical science is exemplified in the choice of "Human Entozoa" as the subject for his graduation thesis.

During his excursions into zoölogy, while still a student of medicine, he became deeply interested in the Chiroptera, and the material collected by the explorer, Du Chaillu, supplied the basis for Dr. Allen's first contribution to scientific literature—a description of four new species of African bats—published in the *Proceedings of the Academy of Natural Sciences of Philadelphia* in 1861, the year of his graduation in medicine. From this time on the bats became a favorite subject for Dr. Allen's investigations and claimed many of the hours devoted to research, which an unflagging industry and unremitting enthusiasm enabled him to

conserve from days loaded with professional duties. His studies of the bats soon won for him recognition, not only in this country but also abroad, as an authority concerning these curious mammals. These and other lines of investigation established Dr. Allen's reputation as a naturalist, and when, in 1865, the Auxiliary Faculty of Medicine was created, he was fittingly called to the chair of zoölogy and comparative anatomy. This position he occupied until 1878, when he was elected professor of physiology in the medical school. This transfer did not estrange Dr. Allen's real zeal from the contemplation of structure to that of function, for his mind and training were those of the anatomist, seeking to unravel the constitution and morphological significance of structures whether of man or of the lower animals. Some of his scientific contributions of this period, however, dealt with animal locomotion and afforded their author the enjoyment of analyzing the action and adaptation of muscles and their groups.

Notwithstanding the deep interest with which Dr. Allen approached the purely scientific aspect of anatomy, his experience as a surgeon and practitioner made him keenly alive to the desirability of impressing the importance of its practical applications. The outcome of this twofold concern led to the publication, in 1884, of Dr. Allen's voluminous contribution, *System of Human Anatomy, Including its Medical and Surgical Relations*, a quarto volume of over 800 pages, illustrated with 109 plates from dissections made by the author. The utilitarian feature of the work was given unusual prominence and embodied the novelty of citing illustrative cases, with specific references to available literature. The search through medical and surgical journals for appropriate examples of disease and injury, as well as the preparation of the dissections and text, represented years of exacting labor, and the work will endure as a monument to the persevering industry of its author.

Determining to cultivate more vigorously the specialty rhinology, with which he had already been identified and for which his close study of minute detail had admirably prepared him, in 1885 Dr. Allen relinquished the uncongenial duties of the chair

of physiology. His hope of finding leisure, between the busy hours of office practice, for the continuance of research was realized, and we find eighty papers credited to Dr. Allen after 1885; of these papers, forty-five related to various anatomical subjects and the remaining thirty-five to medical topics. Among the latter, many are of great practical value, as well as pregnant with morphological suggestion, for Dr. Allen must be regarded as one of the founders of modern rhinology.

After the death of Dr. Joseph Leidy, 1891, Dr. Allen succeeded the great naturalist as Professor of Zoölogy and Comparative Anatomy in the Biological School of the University of Pennsylvania and as Director of the Wistar Institute of Anatomy and Biology. These positions he occupied until 1897, when death cut short the all too brief career of the brilliant scientist.

The 213 titles, comprising the bibliography of Dr. Allen, are almost equally apportioned between his scientific and medical writings. Of the 100 papers pertaining to anatomical subjects, about one-third are devoted to the bats, concerning which mammals he was the acknowledged American authority. The remaining sixty odd papers of this group contain interesting observations covering a wide range of subjects, including the skull, the teeth, the limbs and malformations, among the latter being the report of the autopsy on the celebrated Siamese Twins. Dr. Allen's papers upon medical topics often contained hints and suggestions as to morphological significance of the conditions under discussion, for whether as teacher, clinician or writer, he was ever alert to open the vista to a wider vision and a fuller understanding.

I have the honor to present, on behalf of the donors, this portrait of Dr. Harrison Allen, bespeaking for it a place in these halls among the portraits of the illustrious Fellows who have brought renown to the College. While the lives of these men have been a stimulus and inspiration to their successors, the accomplishment of no one of them offers a more worthy exemplar of notable twofold achievement than that of him whose earnest and kindly face looks from this canvas.

# MEMOIR OF SAMUEL GIBSON DIXON, M.D., LL.D.[1]

By JAMES M. ANDERS, M.D., L.L.D.

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The death of Dr. Samuel Gibson Dixon closed a career that was highly remarkable for its brilliancy and useful achievement. It has been given to few members of the medical profession to accomplish equally important tasks, more particularly in the domains of scientific research and sanitation in its broadest and most fruitful sense. He served his city and State by his keen interest and zeal in education, both technical and popular, by his long and remarkably efficient administration of the Department of Health of Pennsylvania, an office to which he brought much energy, a high order of organizing ability and the scientific spirit of the age, as well as by his successful administrative work as the president of a world-famed scientific academy. But though he departed this life before the fulness of years had been attained, the stimulus of his example and the inspiration of his splendid courage, enthusiasm and distinguished presence remain the precious possession of his contemporaries—of us.

Dr. Dixon, a descendant from a long line of Quaker ancestry, easily traceable to "two famous old English family strains," was born at Gibson's Point, on the Schuylkill River, just below Bartram's Garden, March 23, 1851; he was educated in the schools of the Friends, in Mantua Academy, and later was graduated from a mercantile college. In 1877 he was admitted to the Bar, where he was associated with his brother, Edwin S. Dixon, Esq., for a period of six years, during which he met with marked success. A

[1] Read October 2, 1918.

keen interest in chemistry and physiology, most probably brought about by failure of health and search for recovery from 1881 to 1883, led him to forsake the law and take up the study of medicine. In 1886 he received the degree of Doctor of Medicine, with honors, from the University of Pennsylvania Medical School, and subsequently spent more than a year in European laboratories for the purpose of equipping himself for the pursuit of scientific research and the teaching of hygiene and sanitation. Upon his return, in 1888, he was asked to create the department of hygiene in the Medical School of the University; this he did and became the Professor of Hygiene and Dean of the Auxiliary Department of Medicine, and later also Professor of Sanitary Engineering. He established the first laboratory of hygiene in the University of Pennsylvania, one of the first of its kind on the American continent.

After an interregnum of a few months, Dr. Dixon became a research worker from the time of his graduation in medicine. The bacteriology of tuberculosis was the first subject to seriously engage his attention, and to him belonged the proud distinction of being the first to describe the branched form of the tubercle bacillus, an epochal discovery and one made while he was a student at King's College, London.

An equally noteworthy scientific advance rested upon his discovery of the production of immunity to the tubercle bacillus, which discovery he published six months before Koch publicly announced similar results from personal observations. It would be manifestly beside my present purpose to detail the controversy which was excited by the claims respectively of these two investigators. The members of the College are not particularly interested in historic processes but only in a lucid statement of their results. From this viewpoint the writer feels warranted in saying that "under the safe appeal of truth to time" the verdict of history will make this epoch-making discovery a part of the record of achievement of the late Samuel G. Dixon. Indeed, American students of tuberculosis have almost unanimously accorded to him the credit of being the first to produce immunity against the tubercle bacillus.

In 1890 Dr. Dixon resigned from the University of Pennsylvania to accept the chairs of Bacteriology and Microscopic Technology in the Academy of Natural Sciences, to which institution, however, he went solely in the capacity of a scientific worker. His indebtedness to the stimulus and inspiration of the great naturalist, Leidy, was recognized by those intimately associated with him at that period. During the latter part of the same year (1890), "while working in his laboratory in the Academy of Natural Sciences, Dr. Dixon developed the tubercle bacillus extract that produces in the lower animals and in human beings the same stimulation toward cure in certain types of the disease that has been found by Trudeau and other students of pulmonary lesions to be brought about by the various forms of tuberculin. Later this preparation was found by surgeons to be effective in the treatment of certain glandular and genito-urinary types of tuberculosis, and ophthalmologists found it equally helpful in the treatment of ocular types."[1]

Dr. Dixon's remarkable productivity as an original investigator was doubtless responsible for his selection, in 1892, as Executive Curator of the Academy of Natural Sciences. Four years later (1896) he was chosen president of the same institution, to which office he was successively elected for twenty-one years.

During his incumbency of the office of president, the Academy witnessed marked developments in many directions. Here proof of his greatness and unassuming superiority, not only as a research worker and practical sanitarian, but also as the possessor of rare organizing ability as well as a charming naïvete, which compelled confidence, loyalty and affection on the part of those associated with him in the work of that institution, was not wanting. Among his numerous scientific interests, record should be made here of the fact that Dr. Dixon promoted the first Peary expedition to Greenland in 1891, and one year later the Peary relief expedition under Heilprin and Bryant.

Both from the standpoint of physical equipment and insti-

[1] Royer, B. F.: Dr. Dixon's Work in Sanitary Science.

tutional scientific advantages he steadily enriched and enlarged, by his untiring efforts, a noble and time-honored temple of science until the end of his most active and useful life. Mention should be made of the fact that Dr. Dixon was a member of the Board of Education of Philadelphia for six years, and during the greater portion of this period served as Chairman of the Committee on Hygiene.

In 1911 he was elected a trustee of the University of Pennsylvania, and in this capacity manifested a constant interest in all movements tending to improve and expand the work of that progressive institution of learning, being especially active in promoting the advances made by the undergraduate School of Medicine and in the planning of the New Graduate School of Medicine.

Among the many activities that crowded his fruitful career, elaborate mention must be accorded to the distinguished post of Commissioner of Health of Pennsylvania, which brought him in touch with great practical affairs and furnished an opportunity, of which he fully availed himself, to render a monumental service to mankind. In 1905, while engaged in conducting the affairs of the Academy of Natural Sciences, Dr. Dixon was selected by the then Governor Samuel W. Pennypacker, who had personal knowledge of his (Dr. Dixon's) fitness for the great task (of his studies in the laboratories of Klein at King's College, London, and Pettenkofer's laboratory of hygiene in Munich, as well as of his reputation as a research worker), as head of the new Department of Health for the Commonwealth of Pennsylvania.

While perhaps most widely known for his pioneer and original work in the prevention and treatment of tuberculosis, the practical results achieved by the Health Department are universally conceded to be most noteworthy and have been officially recognized both at home and abroad. Better equipped both by special previous training and native organizing ability than any other American, unhampered by tradition either inherited or acquired, and aided by a popular sentiment then rapidly crystallizing in favor of public health work, a new and an efficient State wide organization was speedily formed, and fortunately amply supported by the Legis-

lature, which provided for the health interests of all the various sections of our State. Proof of his remarkable organizing ability was not wanting; indeed, it greatly impressed those engaged in public health work throughout the country, and to this is due the generally admitted fact that his was the best illustration in America of a centralized State Health Department. The absence of a period of inaction at the commencement was due to the smooth working of a large and complicated administrative machine whose resources rendered possible early efficient service. The moral effect and educational value of the operations of the Department of Health have been tremendous.

Never was a public health official more anxious to advance the interests of the public along the lines of sanitation, personal hygiene and preventive medicine, never one who had the welfare and happiness of the people more at heart than Dr. Dixon. He virtually chained the State of Pennsylvania to the chariot wheels of the comparatively modern, vigorous, national, public health movement.

To enumerate all of the various achievements of the twelve-year period during which Dr. Dixon occupied the distinguished post of Health Commissioner for the State of Pennsylvania would not be possible in this place, but it is incumbent upon the writer to epitomize the more extraordinary accomplishments.

His first and constant aim was to make the people see "public health problems from the viewpoint of benefits to be obtained." The first organizational effort was that of planning the details of a Bureau of Vital Statistics, which the Federal Census Office later voted to be the best agency of its kind of any State in the Union. Additional divisions, each entailing complicated details, were organized in the order following: Medical Inspection; Sanitary Engineering; Division of Laboratories; Distribution of Biological Products; Accounting and Purchasing Supplies; Tuberculosis Dispensaries and Sanatoria; Bureau of Housing (to operate over the entire State outside of the cities of the first class); the Division of Public Service, and during the last months of Dr. Dixon's life, one for the Control of the Sale of Narcotics, another of Child Hygiene

"planned and organized to meet the unusual conditions to which the lives of children would be subjected during the high-tension period of the war," and lastly a Division for the Treatment of Social Diseases, created mainly with the hope of ameliorating suffering and protecting America's Selective Service men.

To the organization and planning of the tuberculosis work of the State—then a new field—Dr. Dixon devoted his best energies and closest supervision until the close of life. His indefatigable labors gave what was urgently needed by Pennsylvania, to wit: three large sanitoria in her mountains with a total of 2300 free beds and 115 tuberculosis dispensaries for the poor, scattered over every section of the territory within her boundaries.

The Health Department over which Dr. Dixon presided with full power, recognizing no authority above his own, is a striking example of combined creative effort and natural evolution.[1] He brought to his great task a full panoply of ideas, which he had the technical knowledge, ability and experience to apply to the direction of the affairs of his department, brilliant results promptly becoming apparent. Nor was this all. We, his survivors, will gladly acknowledge the educational value of the annual reports of the Department of Health, the Monthly Bulletins published from July 1, 1906, to and including February, 1918, and especially of the Health Talks published in the urban and rural press, beginning with February 2, 1914.

It has been truly stated that "he worked up to almost his last hour in behalf of the passion of his life, the promotion of the health of the people."[2] In the few months before his demise, Dr. Dixon possessed his usual marvellous power of suggestion, and was aglow with visions for unsolved problems, as shown by his president's address, which was read for him by his friend and associate, Dr. B. F. Royer, before the Medical Society of the State of Pennsylvania, on the occasion of its annual meeting in 1917.

Dr. Dixon was elected president of the Medical Society of the

[1] For details of the extent and quality of the activities of the State Health Department, consult Dr. Dixon's work on Sanitary Science, by Dr. B. F. Royer.
[2] The Alumni Register, University of Pennsylvania, April, 1918.

State of Pennsylvania in 1916—a high compliment to a State official who had for more than a decade often found it necessary to enforce, in a drastic manner, against medical men, certain legal requirements. The fact that he was ill of his last and fatal pathological invasion at the time of the meeting of that society over which he would have presided if his physical condition had permitted, weighed heavily upon the minds and hearts of its members, for he had easily earned the right to that distinguished office by his keen interest in its various activities and contributions to the proceedings during the decade last past. On the other hand the meaning and possibilities to the present and future generations of a life so completely abandoned to the advancement of science and the good of man cannot be lessened by a long and painful illness, for such he patiently endured, nor the unchangeable law of the universe even—by death.

A complete bibliography of the papers and public addresses published by Dr. Dixon, principally on subjects pertaining to the broad field of sanitary science and preventive medicine, as well as tuberculosis, numbers more than 130—far too numerous to list in this memoir. Among the many prominent positions held by Dr. Dixon, apart from those before more or less lengthily referred to, the following are quite worthy of enumeration: Member of the Finance Committee of the College of Physicians; Vice-President of the Ludwig Institute; Vice-President of the Zoölogical Society of Philadelphia; member of the Board of Managers of the Grandom Institution; member of the Committee on Public Policy and Legislation of the Medical Society of the State of Pennsylvania and Counsellor of the American Philosophical Society. Dr. Dixon enjoyed membership in practically all local and national medical and scientific organizations. Honors and recognitions, among which may be mentioned the honorary degree of LL.D., from his Alma Mater, came to him constantly.

No estimate of this rich and active career would be complete without taking into account Dr. Dixon's remarkable personality. Attractive to his many friends, well-graced, remarkable for gentleness of manner, yet constantly manifesting much strength and firm-

ness of character, he inspired and encouraged those who were so fortunate as to come under the stimulus of his influence. And while he appeared to be less conciliatory at times than some of his distinguished associates, among those who enjoyed the rare privilege of an intimate acquaintance with him, his rugged honesty of purpose could never be questioned. To Dr. Dixon science owes a great debt, mankind a greater; his memory will receive the grateful homage of all Pennsylvanians, by whom he was universally beloved.

As was said of his illustrious contemporary and friend, S. Weir Mitchell, it may be truly said of him: "Happy such a life and happy the memory thereof, which we shall ever cherish."

# MEMOIR OF JOHN KEARSLEY MITCHELL, M.D.[1]

By CHARLES W. BURR, M.D.

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John Kearsley Mitchell, son of S. Weir and Mary Middleton (Elwyn) Mitchell, was born in Philadelphia July 13, 1859. His paternal grandfather was Dr. John Mitchell, one time professor in Jefferson Medical College, a man prominent among the physicians of his day, scholarly, and with a scientific type of mind. The subject of this memoir spent his boyhood years in Philadelphia. He was a student at Harvard for a time, but received his bachelor's degree in 1904, some years after leaving college. He was graduated in medicine by the University of Pennsylvania in 1883 and married Miss Anne Kepple Williams in 1899. He was resident physician in the Children's Hospital in 1883 and in the Episcopal Hospital during 1885. Later he became one of the demonstratros in medicine and finally a lecturer at the University of Pennsylvania, resigning in 1898. Soon after the ending of his internship at the Episcopal Hospital he became the assistant to Dr. now Sir William Osler at the Orthopædic Hospital and Infirmary for Nervous Diseases, and some years later was elected visiting physician, a position he held until his death. Really the Infirmary, as we like to speak of it, though the populace and the surgeons persist in calling it the Orthopædic, was the one institution with which his lifework was bound up. His medical studies throughout his life were based on the clinical material supplied by its clinics and wards. His father was one of its founders. Dr. Osler strongly influenced for good every resident and assistant who worked there, guiding the tottering feet of many an unfledged, unlicked medical cub along the

[1] Read December 4, 1918.

way of clear thinking toward the goal of true science. I think I am safe in saying that, barring his father, Dr. Osler had a greater intellectual influence on John K. Mitchell than any other physician.

He was elected a Fellow of the College in 1888 and always took an earnest and active part in its affairs. Especially was he interested in the Directory for Nurses and in the labors of the Hall Committee. Since I have never been on this committee I may be permitted to say that it is one of the most useful, and one of the least talked about, of all our committees; the Fellows never realize the work required to keep material things in order. We take for granted that, of course, heat, light, painting and other very commonplace things, things not interesting in themselves, will be looked after. Dr. Mitchell was a member of the Association of American Physicians, the American Neurological Association, the American Medical Association, and, of course, of many local medical societies. His club instincts were fed by membership in the Philadelphia, Rittenhouse, Country, and University Clubs and his literary instincts by the Pegasus Club and the Franklin Inn.

He wrote many papers, but I am not going to give a detailed list of his contributions to medical literature. His most important purely scientific work was his book on *The Remote Consequences of Injuries of Nerves*, published in 1895. In preparing it he reëxamined some of the surviving patients whom his father had studied years before when writing on *Diseases and Injuries of Nerves*. His medical interest was always practical, what can be done to help the patient, and he was particularly interested in the physical methods of treatment of the chronically ill, hence his work on *Mechanotherapy, Massage and Physical Education* was of great use to practitioners of medicine. He died on April 10, 1917, after a long illness, during which he made a brave fight against the inevitable, and often worked when resting would have been wiser, or wiser if one care enough for life to want to live, having lost the power to do, to accomplish.

So much for the catalogue of dates and facts, the externals of a man, now a few words about the man himself.

The span of Dr. Mitchell's life covered a most remarkable period—a time of revolution, of world-wide mental and social unrest, and, as some hope, of evolution. Our vision may be dimmed by the nearness of events and our emotions may have caused illusion, but certainly few other periods in European history compare with the present time in instability and loss of equilibrium, though whether the complete change in attitude toward religion, politics and science is all a betterment remains to be seen. War was almost continuous throughout his life. During his childhood it was decided by the final arbitrament of civil strife that these United States are not a mere bundle of separate sovereignties bound loosely together, but an organic union, a nation. Throughout his life there continued the great battle of students of physical science, the real engineers, to control the great forces of nature and compel them to be in truth man's slave, and, indeed, some think that we moderns have fought the battle against material nature with greater earnestness and to a greater success than we have fought that other, and vastly more important, battle, the one for the freedom of the spirit. When he was a youth the doctrine of evolution in biology, seen dimly by many throughout the ages and now and again preached, sometimes vaguely sometimes with clarity, to deaf ears by men of genius, began to spread widely, to be systematized, and finally was accepted by all men. He was born not many years after the prescientific era in medicine, or, rather, saw the death of the last prescientists (from Hippocrates down there have always been a few men of scientific instinct), and saw, *e. g.*, the growth and acceptance of the bacterial theory of the origin of much disease. He was placed in the rather uncomfortable situation when a student, as indeed we all were, of having to learn from one professor of surgery that pus was laudable, or at least might be so, while taught by another that it was always evil and that its cause, germs, could be killed by spraying the whole neighborhood with a stinking concoction of carbolic acid. It is curious that the open-minded teacher was, by not a few years, older than he whose mind's doors were tight shut to any new acquaintance in the world of ideas, a very

cad in things mental, though a gentleman in things emotional. He saw almost the birth of physiological chemistry, which now has grown so large and become so technical that men of middle age, who regard themselves as not inferior as thinking animals, flounder in a sea of knowledge of which they have no real comprehension. I speak with sympathy because I also flounder. He saw the great development of animal experimentation by scientific methods with its tremendous results for good to men and animals alike. He also saw the widespread growth of that insanity which is striving to strangle rational therapeutics, *i. e.*, therapeutics based on experimentation, and preaches that it is better a child should die than a dog be killed. In sociology he saw the very foundations torn up, scattered, thrown to the winds, or at least seemingly this thing has happened, and paranoiac political quacks preaching many wild doctrines from murder up or down and having many followers. He saw the world on fire, but did not live to see his country, blinded and dumb, perhaps by order, for three long years, finally find speech and vision and come to action to help the powers of righteousness overcome the powers of evil.

How did he react to all this welter of word and thought and act? As he could not, with his inheritance, help but do—as a gentleman should—helping the sick, getting much pleasure from literature and science, keeping his feet firmly on the ground.

# AN ADDRESS[1]

By THOMAS R. NEILSON, A.M., M.D.
ACTING PRESIDENT

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The By-laws of the College provide that there shall be delivered at the January meeting an address by the President. In this way it has been long a matter of usage to present to the Fellows a résumé of the work and activities of the College for the previous year, as gleaned from the annual reports of the various officers and committees, to express comment where indicated, to consider questions of policy and to point out, perhaps, new directions in which the functions of the College may be properly exercised or its usefulness extended.

In the absence of the President it falls to the lot of the temporary presiding officer to place before you at least a summary of last year's work and of the present condition of the College.

Soon after the entrance of the United States, on April 6 last, into the great war raging in Europe for now well-nigh three and a half years, Base Hospital Unit No. 10 (Pennsylvania Hospital), of which our President, Dr. R. H. Harte, our Vice-president, Dr. William J. Taylor, and our Secretary, Dr. Francis R. Packard, together with some of the Councillors and several members of our standing committees, were officers, was called into service, and in May last they left us for duty "somewhere in France," where they have been and still are on active duty.

To be Acting President, Dr. George E. de Schweinitz, a distinguished and honored former President of the College, was elected at the May meeting. With characteristic energy and ability he

[1] Prepared for the meeting of the College of Physicians of Philadelphia, January 2, 1918.

discharged the duties of the office until and including the October meeting, when, having been called by the National Council of Defense, of which he is a member, to active military duty, he was obliged to resign.

At the November meeting the present incumbent was chosen to be your Acting President, accepting the honor conferred upon him with deep appreciation; at the same time, however, fully realizing his inequality to the task, which under the conditions he is glad to undertake, while circumstances permit, feeling assured of your generous indulgence and assistance.

As Acting Secretary, Dr. John H. Girvin was elected at the May meeting, and has since then admirably discharged the duties of that important office.

For service in the Medical Corps of the great army and naval forces of the country, whether as officers of the Medical Reserve Corps, members of Base Hospital Units or other posts in the medical service, the response of Fellows of the College has been a notable one. Including the officers above named, 190 of our Fellows have volunteered their services to the Government, and doubtless more of us will be added to the number before the conflict will have ended. A service flag, 10 x 18 feet, has been on display for several months.

Dr. Hutchinson is still at the American Ambulance Hospital in Paris, where, since early in the war, he has discharged the duties of a most responsible position with distinguished ability.

A questionnaire has been sent out by the Secretary, pursuant to a resolution of the College, for information as to commissions received and war services rendered by the Fellows. The value of the information to be obtained in this way for our records will obviously be great, and it is to be hoped that a full response will be received.

The Library has been open to all men in uniform and the privilege much appreciated by officers from all over the country attending the special courses of instruction in Philadelphia.

*Scientific Business.* The scientific business of the past year comprises a creditable number of interesting and important

papers, a number of which had for their subjects topics or observations bearing on military surgery or related matters. The total number of papers for the year was twenty-five, five of which were read at a special meeting. Of these papers eleven were presented by Fellows while fourteen were read on invitation by gentlemen not Fellows of the College. Lantern demonstrations were used to illustrate ten of the papers. The Committee on Scientific Business is entitled to grateful recognition by the College for having so successfully arranged the programs.

Two lectures were delivered during the year. On April 19, 1917, Lecture I of the Nathan Lewis Hatfield Lectures was delivered by Professor A. B. Macallum, M.D., F.R.S., of Toronto, Canada, on "The Ancient Factors in the Relations between the Blood Plasma and the Kidneys." On March 29, 1917, Dr. A. T. McCormack, of Bowling Green, Ky., delivered the first of the Mary Scott Newbold Lectures, for the endowment of which the College is indebted to the liberality of Mr. Clement Buckley Newbold. The subject of this lecture was "The Threat of National Inefficiency from Ill-health."

Two notable portraits have been added to the valuable and interesting collection of the College. At the April meeting a portrait of Dr. James C. Wilson, the gift of Mrs. Wilson, was added to the group of portraits of former Presidents, the presentation being made by Dr. Francis R. Packard. At the May meeting a portrait of the late Dr. John H. Packard, for a time Vice-President and for some years Secretary, was presented by Dr. Harte on behalf of the donor, Dr. Francis R. Packard.

A number of valuable curios and objects of historic interest have also been presented to the College. Appreciative mention of these is made in the reports of the Library Committee and the Committee on the Mütter Museum.

*Membership.* We have lost during the year 8 Fellows: 4 by death, 3 by resignation and 1 by forfeiture. Eleven Fellows were added by election. The death of 3 Associate Fellows—2 foreign and 1 American—was reported. One Corresponding Member was elected.

The roll of the College on December 1 last includes: 466 Fellows, 27 Associate Fellows (17 American and 10 foreign) and 6 Corresponding Members—a total of 499. There was a net gain of 3 Fellows and 1 Corresponding Member, while there was a loss of 3 Associates. 424 of the 466 Fellows reside in Philadelphia or in its immediate vicinity in Pennsylvania, while 42 are non-residents.

*Necrology.* It is our sad duty to chronicle the loss by death of the following:

Joseph W. Warren, elected a Fellow in 1893, died on December 20, 1916, in Harrisburg, Pa., at the age of sixty-seven years. Receiving a degree in medicine at the University of Bonn, Germany, he was thereafter for a number of years a teacher in the department of anatomy in Harvard Medical School. From 1891 until 1913 he was professor of physiology in Bryn Mawr College. He was next appointed assistant to the State Commissioner of Health of Pennsylvania, holding this position until the time of his death. A diligent worker and teacher in the fundamental branches of medical science, to which he devoted his energies, Dr. Warren was for many years constant in his attendance at the College meetings, showing his interest not only in the scientific proceedings but in the transaction of the private business of the College as well.

George Hudson Makuen died on February 21, 1917, at Goshen, N. Y., in his sixty-second year. Elected a Fellow in 1893, Dr. Makuen was widely known for his skill and ability in the field of laryngology, and especially for his very considerable work and experience relating to defects of speech, of which subject he was professor in the Philadelphia Polyclinic. He made many contributions to the literature of his chosen speciality, some of them being read before the College, and was honored by several of the special societies by deserved election to high office.

John Kearsley Mitchell, born in 1859, elected a Fellow in 1888, died on April 10, 1917, after a protracted illness. Receiving his degree in medicine from the University of Pennsylvania in 1883, Dr. Mitchell, for a number of years in his earlier professional life, in addition filling an appointment as assistant physician to the

Orthopædic Hospital and Infirmary for Nervous Diseases in the clinic of his distinguished father, the late Dr. S. Weir Mitchell, held positions on the medical staff of several different hospitals and also was a demonstrator and instructor in the University; but for many years preceding his death he devoted himself especially to neurology, in which branch of medicine he enjoyed a large private and consulting practice. His literary work comprised many interesting and important contributions, a number of which he read before the College.

Inspired by the zeal and devotion of his beloved father to the College, Dr. Mitchell was always active and interested in its affairs, serving with great fidelity as chairman of the Hall Committee. Courteous in manner, considerate of the opinions and feelings of his associates, efficient in the discharge of duty, he leaves behind him a creditable and enviable record, and his loss from the management of the College will long be felt.

Archibald G. Thomson died on October 20, 1917, at the age of forty-eight years. He was elected a Fellow in 1897. After receiving his degree in medicine from the University of Pennsylvania, he for some years assisted his father, our late distinguished Fellow, Dr. William Thomson, in his ophthalmic practice, and in addition held positions in the Wills Eye Hospital and in the ophthalmological departments of the University and the Orthopædic Hospitals. He was also ophthalmic surgeon to the Pennsylvania Railroad Company. For some years, however, preceding his death Dr. Thomson was not active in professional work. He was a man of attractive personality, and while engaged in the practice of his profession, gave evidence of considerable ability.

Theodor Kocher, of Berne, Switzerland, an Associate Fellow, elected in 1903, died July 27, 1917, aged seventy-six years. His famous career began with his election in 1872 to the professorship of clinical surgery at the University of Berne, from which institution he was graduated in 1865. In due course he became professor of surgery and director of the surgical clinic, the position which he held for many years, and in which he achieved his greatness. A renowned teacher of surgery and an indefatigable clinician

throughout his long life, his great experience made him an authority on many surgical subjects. In the surgery of goitre his fame was world-wide. He wrote extensively, and his text-book on *Operative Surgery* was indeed a splendid production. So great was the merit of this work that it was translated into English, French, Italian, Russian and Spanish. In the death of Kocher the College loses an Associate Fellow whose name it was an honor to have upon our rolls, and the world one of its truly great surgeons.

David Williams Cheever, of Boston, Mass., elected an Associate Fellow December 1, 1886, died at the age of eighty-four years, on December 27, 1915. A graduate in arts and in medicine, as well as the recipient of the degree of LL.D., of Harvard University, Dr. Cheever was one of the eminent surgeons of this country. For a quarter of a century, from 1868 to 1893, he taught surgery at Harvard, first as adjunct professor of clinical surgery, next as professor of clinical surgery, and then as professor of surgery, from 1882 to 1893, when he was made professor emeritus. He was a prolific writer as well as a scholarly teacher. Dr. Cheever was one of that group of distinguished men to whom were extended the honor of Associate Fellowship in the College on the occasion of the celebration of our Centennial Anniversary, in January, 1887.

Theophile de Valcourt, of Cannes, France, prominent Foreign Associate Fellow, elected in 1869, died on a date which the Secretary has been unable to obtain. Dr. Valcourt was a member of many medical and scientific societies in Europe, and was surgeon of the Cannes City Hospital. His death removes a distinguished name from our roll.

*The Library.* The elaborate and exhaustive report of the Library Committee, presented by its chairman at the December meeting, shows that there are in the Library a total number of 119,019 volumes, including bound volumes as well as 16,451 unbound Reports and Transactions; of unbound Theses and Dissertations, 9010; of unbound pamphlets, 93,133. These figures include 3847 reserve or second copies of certain important periodical publications, besides 2976 more or less incomplete volumes.

There were received during the year from all sources 3642 volumes, 7930 pamphlets and 12,867 numbers of periodicals, the total increase of volumes for the year being 2606. Of 764 new publications, 37 were works written or edited by Fellows of the College.

The total number of donors was 478, from whom were received 986 distinct presentations.

The Library Committee calls attention to the fact that there were received during the year less than one-half of the current periodical publications listed on the cards. None was received from Germany. There was a decrease in French periodicals of 173, of those of Great Britain and the Colonies 38, Italian 30, other countries 37, United States 120.

As to books received during the year, there has been a slight increase in the number of new publications.

There were received in response to requests photographs of four Fellows. An attempt is being made to obtain photographs in uniform of the Fellows who have entered the service of the Government, with a view to the formation of a war volume. It is to be hoped that the effort will be successful and that there will result a complete collection of photographs which will be of interest in the years to come.

### Incunabula

The total number of Incunabula is now 218 titles, 211 volumes, 18 additions having been made during the year, as follows:

Ars memorativa. Ingoldstadt, Johann Kachenlofen, Circa, 1493.
The only copy known except one in the Berlin Royal Library.
Fund for Rare Books.

Compendium sententiarum praeclarissimarum adversus astrologiam. Modena, Rocociola, Circa, 1490. [Hain-Copinger 5570.]

Glanvil, Bartholomaeus. Liber de proprietatibus rerum. Colonia, Koelhoff, 1481. [Hain-Copinger 2501.]
One of the earliest of the many editions of this famous encyclopædia of natural history and medicine. Fund for Rare Books.

Hermes Trismegistus. Liber de potestate et sapientia Dei. Venetiis, Damianus de Mediolano, 1483. [Hain 8461.]

Dedicated to Cosimo Medici by the commentator, Marsilius Ficinus Florentinus. Fund for Rare Books.

Lucretius Carus, Titus. De rerum naturæ liber. Verona, Paulus Fridenperger 1486. [Hain-Copinger 10282.]

The second issue of this work but the first dated edition. Only book from this press. Fund for Rare Books.

Molitor, Ulricus. De lamiis et phitonicis mulieribus. [Cologne, Cornelius de Zierikzee, Circa, 1490.]

Most famous XVth century book on witchcraft.
Fund for Rare Books.

de Orbellis, Nicolaus. Logica. . . cum textu Petri hyspani. Venetiis, Rubeus, 1500. [Not in Hain.]

Commentary on the writings of Petrus Hispanus who became medical Pope, John XXI. Fund for Rare Books.

[Pergamenus, Nicholas.] Liber dialogus creaturarum appellatus. Cologne, Conrad Winters de Homborch, 1481. [Hain 6126.]

Very rare edition of this famous collection of fables.
Fund for Rare Books.

Petrus de Abano. Expositio in librum problematum Aristotelis. Venetiis, Herbort, 1482. [Hain-Copinger 17.] Fund for Rare Books.

Pico della Mirandola, Giovanni count. [Opera.] Bononia, Benedictus Hectoris, 1496. [Hain-Copinger 12992.]

First edition, including his medical and astrological treatises.
Fund for Rare Books.

Publicius, Julius. Oratoriæ artis epitoma. . . insuper et perquam facilis memoriæ artis modus. . . Venetiis, Ratdolt, 1485. [Hain 13546.]

Duke of Sussex's copy. Most beautiful book printed by Ratdolt.
Fund for Rare Books.

de Sacro Bosco, Joannes. Sphæra mundi. Venetiis, Bonetus Locatellus, 1490. [Hain 14113.]

Illustrated with astrological wood-cuts. Fund for Rare Books.

Salernum, School of. Regimen sanitatis Salernitanum. [Montpellier. 1480. [Hain 13747.]

First dated edition. [Brunet.] According to Ebert and Choulant, the first edition. Fund for Rare Books.

Salernum, School of. Regimen sanitatis Salernitanum. [Louvain, John of Westphalia, Circa, 1482.] [Hain 13749.]

Finely printed in two Gothic types at the second press in Louvain. Fund for Rare Books.

Salernum, School of. Regimen sanitatis Salernitanum. [Coloniæ, Circa, 1480.] [Hain 13751.]

Contains also Arnoldus de Villa Nova's own treatise on Hygiene. Fund for Rare Books.

Scott, Sir Michael. Liber phisionomiæ. . . de procreatione et hominis phisionomia. . . [Hain-Copinger 14550.] Venice, Jacopo de Fivizano, 1477.

First dated edition of the earliest printed work on generation. Fund for Rare Books.

Scott, Sir Michael. Liber phisionomiæ. . . de procreatione et hominis phisionomia. [Circa, 1490.] [Hain 14546.] Fund for Rare Books.

Theobaldus. Bishop. Phisiologus de naturis duodecim animalium. [Circa, 1480.] [Hain 15467.]

First edition. Rare. Fund for Rare Books.

There were also added to the Library a large number of works of special interest.

The number of visitors to the Library during the year was 3864, a decrease of 2046 as compared with the previous year. The number of visits to the Library by Fellows of the College was 1116 as compared with 1864 for the year 1916, a decrease of 748.

The Library was open on the six minor legal holidays, and also, as in previous years, two evenings during the week. The evening visitors numbered 510, 43 less than last year; Fellows of the College 132, a decrease of 24 from last year's figures. On legal holidays there were 50 visitors, 24 less than in 1916, 11 Fellows of the College, a decrease of 6.

The number of books consulted in the Library, that is, those supplied on request, was 10,764, a decrease of 9044 from the number so consulted in 1916 and a decrease of 15,006 from 1915.

In reporting the number of books consulted the Library Committee points out each year, very properly, that the number supplied on demand for consultation does not represent accurately the total number consulted in the Library, for on the shelves in the Reading Room are bound volumes to which all visitors have access, and which are frequently used, and the books in the stacks are accessible to the Fellows, who frequently exercise their privilege. No account can be kept of the books consulted in either way.

The number of books taken out during the year shows also a falling off—3450 books were taken out in 1917; 4533 in 1916, a decrease of 1083.

The work of revision of the Catalogue has been completed to the end of the second series of the Index Catalogue of the Library of the Surgeon-General's Office.

10,712 unbound pamphlets and reprints have been made accessible and available for use by subject-heading, and arranging alphabetically by subject, and by author under the subject. The Library Committee has wisely determined that all miscellaneous bound volumes of pamphlets shall be taken apart and the pamphlets subject-headed, and that when this is accomplished the pamphlets will be bound by subjects.

The protection of the books in the stacks from soiling due to the percolation of dust-laden atmosphere through the closed windows, by sealing the windows with brick and mortar, and by the instillation of an air-washing machine and a complete ventilating system, as authorized by the College, has been in progress under the direction of the Library Committee. The windows have been sealed since last August, but the completion of the ventilating system has been delayed, owing to conditions resulting from labor complications and other unavoidable causes. When this work is finished the College will be able to congratulate itself upon the possession of an improvement of incalculable value for the preservation of its splendid library.

The photostat, installed in the latter part of 1916, has been proved of service in making prints from books in the library for some of the Fellows and for others at a small and reasonable cost. It has also proved most useful in making a large number of prints, including complete copies of 39 incunabula, for the Library.

The Morris Longstreth Fund was materially increased by the addition during the year of the sum of $14,964.04, being the net amount due to the College for its share as a legatee from the sale of the property in Spruce Street, formerly the residence of Dr. Longstreth. The present total amount of the various Library Endowment Funds is $320,425.92.

*Finances.* The report of the Treasurer, a copy of which, in obedience to a resolution, is kept in the office for the inspection of the Fellows, shows the financial affairs of the College to be in a most satisfactory condition. The total valuation of our real estate is $561,091.16; securities $458,785.27; cash on deposit on December 1, 1917, $36,278.13, making a total of $1,056,232.31.

All of the accounts of the College have, as is customary, been audited by a public accountant and found to be correct.

The occurrence of two large and disastrous fires in the vicinity of the College building during the summer months, by neither of which, happily (owing probably to the fact that the wind was from a favorable direction on each occasion), was any damage done to our property, led the Treasurer to place additional insurance upon our building and its contents. His action was affirmed in the autumn by the Council and the College.

The task of caring for the financial affairs of the College is obviously no light one, and our thanks are due to the Committee on Finance as well as to the Treasurer for the faithful and diligent manner in which they have performed their duties. It is with much reluctance that the College has yielded to the request of the Treasurer, Dr. John B. Roberts, that he be not elected again to the office which he has filled with untiring zeal and characteristic precision for the past five years.

The annual volume of *Transactions* of the College was issued at the usual time by the Committee of Publication and puts in

permanent form a creditable collection of scientific communications. It is gratifying to state in this connection that the College has directed that hereafter the proceedings of the Sections and records of their scientific activities will be included in the *Transactions,* an additional appropriation for the purpose having been placed at the disposal of the Committee.

*The Report of the Hall Committee* is satisfactory in all respects. Such of the affairs of the College as belong to their domain have been properly cared for. The general condition of the building and grounds is good. Realizing the disturbed general conditions due to the war, prevailing high prices and difficulty in obtaining labor, the Committee has wisely decided to make no repairs nor to have any painting done, unless urgently necessary. The fitting up of the room back of the office of the Directory for Nurses, to make it available as a dining-room for the entertainment of guests of the College prior to the meetings, was completed during the year.

*The Committee on Mütter Museum* reports the Museum to be in excellent condition and that a number of interesting additions in the way of specimens and curios have been made. The Mütter Lecture for 1917 was delivered by Professor Chevalier Jackson before a large audience. His subject was "Observations on the Pathology of Foreign Bodies in the Air and Food Passages, Based upon the Observation of 628 Cases." Illustrated by specimens, lantern slides, radiographs and color drawings.

*The Directory for Nurses,* under the efficient management of its Committee and employees, had a very successful year, supplying in response to calls 3328 nurses, more than 300 in excess of the number of last year. The Committee, after defraying the expenses of operation, was enabled to make, as usual, a handsome addition to the income of the College.

*The Committee on Public Health and Preventive Medicine* has taken up with zeal and thoroughness all matters coming within its scope. It carefully considered certain regulations as to wet-nursing, proposed by the Babies' Welfare Association, and recommended their endorsement by the College, which was given. An Antivaccination Bill introduced into the last State Legislature awakened its

activities, and the objectionable features of the proposed act were called to the attention of the Committee on Public Education. Happily the bill was not reported out of Commitee. The scientific program of the June meeting of the College was devoted to a Symposium on Highway and Street Cleaning, arranged by the Committee.

The Sections of the College have kept up their activities well during the year. The annual reports which were submitted to the College show an attendance, both of Fellows and guests, at their meetings, as well as of scientific work accomplished, which is highly creditable.

A Section on "Industrial Medicine and Public Health" has been created and organized during the year under the regulations of the College, and will offer opportunity and incentive for work along these special lines.

*Council.* The Council has with promptness and fidelity performed the duties imposed upon it. Propositions for Fellowship have been considered, all matters referred by the College have received due deliberation and a number of important items of business have had their origin in the Council. Upon all of this work reports, with recommendations as to action to be taken, have been submitted to the College.

The Alvarenga Prize for 1917 was awarded by the Committee to Dr. Wilburt C. Davison, of Baltimore, Md., for his essay on "The Superiority of Inoculations with Mixed Triple Vaccines (B. Typhosus, B. Paratyphosus and B. Paratyphosus B) over Separate Inoculations with Single Vaccines, as Shown by Agglutinin Curves in Men and Rabbits."

A review of the College work would not be complete if mention were not made of the faithful and efficient services rendered by the Librarian, Superintendent and Clerk, Mr. Charles Perry Fisher, and by Miss Zelner, the Treasurer's Clerk. To both our grateful appreciation is due.

In conclusion it may be said of the record of the year, the one hundred and thirty-first in the history of the College, that it is a satisfactory one—much good work has been accomplished and the

affairs of the College have been faithfully administered and are on a sound basis. But, naturally, evidences of the effect of the war are plainly visible. The most clear indication is found in the marked falling off in the number of Fellows and other readers in the Library. Many, as already stated, are now in the service of the Government. Others will follow. A decrease in the attendance at our recent meetings, too, tells how these men, with growing frequency and in greater numbers, are being called away to active duty. To those who remain, although pressed by other responsibilities, are entrusted the interests and the work of the College.

Individual affairs and those of institutions must, of necessity, give way to the host of activities awakened by the needs of our country for the successful performance of its part, in association with the Allies, in the gigantic struggle for democracy and justice now convulsing the world. But the progress of science will not be checked. Great as have been the studies made in certain lines of surgery and medicine since the beginning of the war, further advances will surely follow. The fruits of observation and investigation will continue to be gathered and added to the store of knowledge for the benefit of humanity. Shall not the College be the medium of some of the communications?

# SOME OF THE ACCOMPLISHMENTS OF ITALIAN MEDICAL MEN IN THE WAR [1]

By VICTOR G. HEISER, M.D.
MEMBER OF AMERICAN RED CROSS COMMISSION TO ITALY

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It is generally understood that the Italian army at the present time consists of at least 4,000,000 men and that the number of hospital beds is approximately 1,000,000. Just what it means in two years to expand a country's hospital service to these huge proportions can be better appreciated when it is recalled that in the entire United States, with a population almost three times as great as that of Italy, there are only 300,000 beds. Yet in spite of this vast achievement, the work accomplished by the Italian medical profession since the beginning of the war has attracted to itself but little attention in this country. The reasons for this are obvious. While probably none of the Allies who are fighting in Europe have received less aid other than financial help from outside their own borders, the medical men of Italy almost invariably were loath to speak of their achievements. There was no boastfulness anywhere. It was characteristic of the Italian medical service to achieve results and then perhaps talk about them. Nowhere did we hear of what the medical service was going to do. It was only of the things they had done of which they could be induced to speak. The equipment necessary for preventing disease and for the care of the sick and wounded has been provided almost entirely in Italy. In many instances establishments for the production of hospital and medical supplies did not exist at the outbreak of the war, and had to be created. Large institutions for

[1] Read January 2, 1918.

the reëducation of the injured that will compare favorably with the best are in full operation. Hospitals rendering excellent service exist near the front-line trenches. New types of hospital construction have been evolved. Mobile hospitals of 100-bed capacity, which can be taken down and transferred seventy-five miles and set up and put in service again within twenty-four hours, are in use; the entire equipment, incuding the hospital furniture, instruments, operating room appliances, and *x*-ray plant, being transported on five camions (motor trucks) and three touring cars. New operations, particularly in dental and lung surgery, new instruments and devices without number, have been developed. The following statement, although very incomplete, may convey some idea of what had been accomplished by the Italian medical profession prior to October 1, 1917:

Organization. The Italian medical service is presided over by an official who has his office with the Minister for War at Rome. The service, however, is not so highly centralized as is the case in this country. There is a chief medical officer, common to all the armies, who has his headquarters near the front, at a point which is the principal center for the storage and distribution of supplies, not only for the medical department but for the entire army. Representatives of the quartermaster's and commissary departments, of the signal corps, ammunition department, Red Cross and other branches of the army are located there. They dine together in a common mess hall and have ample opportunity for coöperation. Under the chief medical officer there is stationed with each army a principal medical officer who has almost determining powers in directing the medical work pertaining to the army with which he is stationed.

The care of the wounded at the front as well as throughout Italy is undertaken jointly by the Italian Red Cross and the Sanitare Militare, or Army Medical Service, medical aid being rendered through the following seven classes of agencies which coöperate in passing back the wounded with a remarkable degree of efficiency, and may be considered in the order of their relative distance from the front-line trenches.

1. *The Posti Medicazione.* These are the most advanced dressing stations for emergency services and are located usually in dugouts in trenches very close to the front.

2. *The Sezione Sanita.* From 1 to 2 kilometers behind the front, usually at a point which can be reached by an ambulance, are the Sezione Sanita, or dispensaries. They are more fully equipped than the preceding.

3. *Ambulance di Montagna.* These are located from 2 to 5 kilometers behind the front and are the most advanced point reached by the Italian Red Cross.

4. *The Stazione di Sanita.* These are somewhat larger and better equipped than the preceding. Tetanus antitoxin is usually given here.

5. *The Ospedale di Campo or Field Hospitals.* These are located in convenient and accessible points somewhat farther back. At the outset of the war these were of 50-bed capacity, but experience soon showed that it was frequently necessary that they be of 500-bed capacity. They are now also used as Smistamento, or distributing centers, at which cases are classified and sent to the various special hospitals.

6. *Ospedale di Tappa.* These are Base Hospitals and may be located several hundred kilometers behind the lines. They are usually grouped, so that in one village or town or area there may be a bed capacity varying from 20,000 to 40,000.

7. *Ospedale di Reservo.* These hospitals are institutions or other large buildings located throughout the cities of Italy which have been made available for the reception of soldiers.

The whole question of handling the wounded is still in a transitional state. Many hospitals, however, have been actually brought near the front-line trenches.

For each army there are a number of large quarantine or disinfecting stations, equipped for the treatment and detention of soldiers who have come from areas in which dangerous communicable diseases have prevailed, as, for instance, cholera, malaria, dysentery and typhoid. These stations are provided with steam-disinfecting apparatus or sulphur-dioxide chambers or other means

for disinfecting clothing and equipment. Special effort is made to sterilize textiles which have become infected and particularly those which may have become infested with body lice or their eggs. Every patient before being admitted to one of the general hospitals is detained at a quarantine station for a sufficient time to permit several microscopic examinations of the stool. All prisoners, likewise, are passed through stations of this kind.

Hospital Construction. The hospital accommodation afforded by the Italian Red Cross consists largely of converted tourist hotels, schools and other large buildings which could be adapted to the purpose. The hospitals provided by the medical service of the army consist of existing army hospitals, many of which have been expanded, converted military buildings or entirely new buildings erected for hospital purposes. The latter are usually one-story pavilions about 14 feet high, 18 feet wide and of any desired length, constructed of angle iron placed on six-foot centers, with the intervening space filled in with hollow tile. The tile resembles that used in fireproof construction in this country. The roofs are also of tile. Buildings of this type can be rapidly constructed and hundreds of beds can be provided in a week or two. Over the course of a year or more they are much cheaper than tentage. They are cool in summer and can be kept warm in winter. It is noteworthy that one seldom sees patients cared for in tents in Italy.

The decreased use of cavalry in this war has made available large numbers of cavalry barracks. These, when renovated, lend themselves to hospital purposes. At Udine, for instance, one of the cavalry barracks has been made into a single hospital ward with 300 beds. The proportions of this ward are immense. From one end of the room it is almost impossible to see a bed located at the other.

Hospital Locations. Hospitals are being located nearer and nearer the front, as it has been deemed advisable to risk the occasional danger from shells, in view of the great advantage in having immediate treatment available for the injured. One finds these hospitals in most unusual positions. It was a novel experience to

be taken thirty to forty feet underground, and there, at a point directly over which a battle was raging, to see the regular hospital routine going on in good operating rooms and wards supplied with artificial ventilation and modern hospital furniture, and, in general, admirably adapted to the purpose. To go to the other extreme, at an elevation of 6000 feet in the Dolomites, we came upon a hospital of 30-bed capacity hewn out of the side of a cliff. The two sides and back wall were of stone and the mountain range at this point was so narrow that through a hole bored in the back wall of the hospital it was possible to look into the Austrian trenches on the other side of the mountain. This hospital may be said to be on the front-line trenches. The wounded who were able to travel after receiving emergency treatment were sent to the rail head on the marvellous teleferica, which often go from mountain top to mountain top over chasms thousands of feet deep.

Hospital Specialization. Specializing has been carried to a high degree. For instance, at Udine we saw 1500 fracture cases in a single hospital. At other hospitals we saw under treatment only gunshot wounds of the chest. One hospital had 70,000 admissions during the month of August, which corresponded to a period of active offensive operations. Some of the hospitals are so large that a motor car is required to visit the various buildings.

Great progress has been made in developing the technic. We were told, for instance, that at the hospital in charge of Bastanelli, Prof. Morelli has invented an improved aspirator for draining fluid from the chest. Pressure within and without the lungs can be accurately read on a gauge, and through the development of special technic, which, among other things, permits the lungs to remain collapsed during definite periods, he has been able to produce some startling results in connection with lung surgery. Prof. Morelli informed us that he had recently completed 100 cases with no mortality. He believed it to be entirely feasible to keep the mortality well under 5 per cent. in all gunshot wounds of the chest.

*X*-ray Apparatus. At the time Italy went to war few factories existed for the production of hospital and medical supplies. There was, for instance, scarcely an *x*-ray apparatus in the country which

had not been manufactured in Germany. At the present time practically every hospital throughout Italy has one or more *x*-ray machines, all manufactured in Italy. Not only is the apparatus as good as that formerly imported, but many competent observers believe it to be far superior.

Ambulance Service. A remarkably efficient ambulance service has been established. With the exception of a few cars furnished through the British Red Cross, all of the ambulances have been supplied by the Italian Red Cross or the Italian Government. Owing to the mountainous character of the service required, heavier cars have been found to be most practical. During active engagement the empty ambulances going to the front carry many additional stretchers. These are filled and placed in the empty camions which have taken ammunition or other supplies to the front. As a modern war is largely a problem in transporation, this reduces the number of vehicles, prevents congestion of the roads and affords prompt service for returning the wounded from the most advanced points at the front.

Hospital Trains. The smooth organization of the hospital train service was one of the most striking features which we saw in Italy. Both the Italian Red Cross and the Army Medical Service provide such trains. There is, indeed, considerable rivalry between these two organizations as to which can furnish the most prompt and efficient evacuation. In a number of instances we saw a train back into a side track next to a hospital, take on board fully 350 wounded and in less then thirty minutes proceed on its way. There was no confusion, and everything seemed to work with clock-like precision.

New Inventions. One is particularly impressed by the large amount of new appratus which has been invented. Formerly Zander or similar apparatus mostly came from Germany. Not only are all these now manufactured in Italy, but a large number of new machines have been invented to meet the needs of war cripples. We saw an ingenious pneumatic tourniquet, new apparatus for jaw surgery, improvements in artificial limbs and many other things too numerous to mention.

Reëducation Institutions. The Rizzoli Institute in Bologna, created many years before the war, had considerable distinction for its prosthetic appliances and methods for the reëducation of lost functions. Almost unbelievable progress in these directions has been made. The Regina Margherita Hospital, or institute for physical reëducation, in Rome will compare favorably with the best of similar institutions anywhere. This institution has a capacity of 1200 patients. Of these, 700 are in the physical therapy division. About 600 patients are discharged per month. Some of the passive exercise machines which have been developed are very clever. Great stress is laid upon specialized forms of physical drill for rehabilitating nerve function. We were shown some truly remarkable results in this direction. The Villa Fiore, which belongs to the American Academy in Rome, has been set aside as an institute for mutilated soldiers. It is directed by Dr. Guali, who has devised most excellent improvements in artificial limbs. It is said that at the outset of the war practically all the limbs had to be purchased in America, but that now almost all are manufactured in Italy at a great saving in cost. Dr. Guali has likewise invented a clever apparatus for registering the pressure of the artificial foot. This apparatus enables him so to modify the limb construction as to bring the pressure to bear similar to that of the human foot. Certainly some of his results were most striking. At the Rizzoli Institute in Milan we saw a soldier who had been blinded in both eyes and had lost both hands, yet who, by the use of a clever apparatus devised especially for him, was able to use a knife, fork and spoon. At other institutions, after the lost function has been partially restored, a trade suitable to the condition of the individual patient is taught. Typewriting, printing, wood-carving, lathework, tinsmith, basket-making and even primary education are taught at these various places.

Quarantine Stations. In addition to the quarantine stations heretofore mentioned as being located in northern Italy, directly in connection with the various hospitals at the front, there are in southern Italy huge quarantine stations which for size will probably long hold world's records. Equipment for steam and sulphur

fumigation, as well as detention barracks, have been provided. For instance, the French, in order to take care of the soldiers returning from the Saloniki and Eastern fronts, have in southern Italy built a quarantine station for 40,000 persons. The British constructed a station for 20,000 soldiers for the same purpose. At these stations careful examinations are made for cholera, typhoid, and dysentery carriers. Blood examinations also are made in order to detect malaria. Soldiers found infected are treated before being allowed to return to Great Britain or France. Italy has established huge stations for the return of her soldiers from Saloniki and Albania. When it is stated that over 100,000 cases of malaria have been invalided back, the importance of these huge quarantine stations is at once manifest.

Laboratories. Laboratory work on a gigantic scale, and especially on the preventive side, has become an intimate part of the medical system in the present war. The examination of the stools for cholera, typhoid and dysentery has entailed an enormous amount of work. With the exception of the cholera imported into Italy at the beginning of the war through Austrian prisoners, that disease has not since made its appearance. Yet cholera carriers are constantly detected. This gives one an idea of the wonderful protection afforded by a modern health service.

Tuberculosis. Considering the size of the Italian army, comparatively a small amount of tuberculosis has been encountered. It is stated that about 5000 cases appeared among the 4,000,000 troops. However, it is said that more than 30,000 tuberculous Italian prisoners had been returned from Austria. The care of these patients is now receiving much earnest attention. Almost from the beginning, *x*-ray diagnosis was used in detecting incipient tuberculosis. This form of diagnosis has now become a routine procedure. New recruits are carefully examined before being admitted to the army, and as rapidly as facilities permit, those suspected of being infected are examined with the *x*-rays.

Reclamation. Among other activities with which the medical service is associated is an active reclamation department. The variety and quantity of articles removed from a modern battlefield

is almost unbelievable; it includes shoes, clothing, gas masks, first-aid packages, brass, shells, parts of guns, motor trucks and almost every other conceivable thing. As soon as practicable after a battle all this paraphernalia, or as much of it as possible, is collected from the field and taken to a central depot. Here it is sorted and sent to the various factories for repairs. Gas masks, for instance, are sent to a gas-mask repair factory, where the necessary mending is done and the masks reissued. Shoes are disinfected, cleaned and reissued. If in need of cobbling two pairs of shoes are often made into one. The same obtains with regard to clothing. There are huge disinfecting plants and laundries in connection with these reclamation stations for the treatment of articles for personal use. Most of the workers in these establishments are women, many of whom are recruited from among the fallen classes.

Fireless Cookers. One of the striking features in connection with the provision of suitable food for the soldiers in the front-line trenches is the very general employment of huge fireless cookers. This enables the food to be prepared in permanent kitchens well behind the lines and assures to the soldier absolutely hot meals no matter how advanced the position in which he finds himself. Huge shops for repairing and retinning these cookers form part of the system.

Prison Camps. The prison camps at the front consist of barbed-wire enclosures with good tents and excellent cooking arrangements. They are divided into three sections: The first is the reception enclosure in which the prisoners are bathed and their clothing disinfected. They are then passed into the second enclosure, where stool specimens are taken for cholera, dysentery and typhoid. After three days' detention in the second enclosure, those whose stools are negative are sent into the third, where they remain perhaps several weeks until arrangements can be made to transfer them to permanent locations in the interior. For the officers, houses of a semipermanent character are provided. One is greatly impressed by the kindliness and consideration which is shown to the prisoners of all classes. The food is the same as given

to the Italian officer or soldier of corresponding grade. No work is required of officers.

Venereal Disease. No actual official records dealing with venereal disease in the army were available. At the front, however, in each army there are special hospitals for the treatment of these cases. The officers and men are not permitted to associate with any women who are not under governmental supervision. The medical officers stated that venereal disease had been reduced to almost negligible proportions.

Medical School at the Front. Among many other novelties introduced by the Italian medical service is the establishment of a complete medical school near the front-line trenches. The character of the fighting up to the present winter has made this possible. From the beginning of the war to the autumn of 1917 practically all of the active military work was done between April and November. During the remaining months, when the army was comparatively inactive, all the medical students who were serving in the hospital corps or other branches were ordered to San Giorgio di Nogaro, at which point professors from the various medical schools who are in the Army also assembled. These professors were assigned to look after the sick in the vicinity of the school. This enabled them to use the clinical material for the benefit of the students. The buildings were mostly of temporary construction, but well adapted to the purpose. Enormous collections of bones and pathological material generally, which had accumulated as a result of the war, were assembled here.

Efficiency. Finally, it may be stated that we were much impressed by the excellent care given to the wounded and the spirit of service manifested by the medical officers. They were on duty early and late, never sparing themselves, quick to meet emergent needs and through it all a wonderful fellowship and mutual helpfulness prevailed.

# SURGERY IN A BRITISH BASE HOSPITAL IN FRANCE.[1]

By Major ALLEN GREENWOOD, M.R.C.

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I am going to do my best to tell you in twenty minutes that which usually takes me an hour and a half to describe. I am not going to give you a talk on eye surgery. When Dr. de Schweinitz asked me to come to Philadelphia, it was with the understanding that I should give you simply some of the experiences of the Harvard Surgical Unit in France. This I can do best by means of the lantern slides, showing you our hospitals, some of the patients and our methods of treatment.

The first picture shows one of the towns of northern France given over to the British Army for its hospital work. I may say that the work of the Royal Army Medical Corps in England and France shows the highest order of efficiency. I doubt whether any organization could be marked with a greater degree of efficiency. All along the coast are base hospitals. An old castle is now used as a hospital for French wounded. This castle was built by Charlemagne in 811, and here Charles Dickens lived and wrote *The Tale of Two Cities*. The walled town of Montreculx is shown on the screen from whence came the Earl of Montreculx, who gave to the City of Montreal, Canada, its present name.

The sanitary problem is a very interesting one. Having had experience in this work during the Spanish-American War, I was asked to be Sanitary Officer in our service in France. Everything

[1] Read February 7, 1918.

likely to cause pollution had to be destroyed before going into the ground. I felt it an honor to the Harvard Surgical Unit when General French stated that the sanitary condition of Base Hospital No. 22 was one of the best in that region.

From the hill back of our hospital, after dark, if there were clouds, could be seen the light of the gunfire on the Somme; looking across to England could be seen three or four lighthouses on the shore, causing one to feel not entirely out of the kindly touch of mother England.

All of the things in our tents could be put in a duffer bag to be carried on the shoulders. The nurses who stayed in France in the last three years have had an uncomfortable time. They have to stand under a strain such as nurses in this country know nothing about. I cannot begin to tell you how much a hospital of this sort depends upon the nurses and how much wonderful work these brave women are giving to the service in France, to the British Government and to our own. In the summer of 1916, in one instance 513 badly wounded soldiers were received in our hospital inside of two hours. It would be difficult to imagine taking into any hospital in Philadelphia 513 patients in two hours' time. Seventy-five per cent. of all penetrating wounds caused by shell fragments entering the hospital in the summer of 1916 gave a culture of the gas bacillus. The type of injury giving the most serious trouble is that which includes the carrying of pieces of clothing into the body. This results in a very serious form of gas gangrene. From an ophthalmological standpoint one type of interesting cases was that showing hemianopsias due to injury of the posterior part of the brain. Upon trephining the hemianopsias frequently disappeared.

One of my most interesting cases was a young Scotchman, who had a small perforating wound which took away part of the humerus, and the whole arm was infected with the gas bacillus when he entered. Instead of amputating at the shoulder an incision was made across the arm, cutting all tissues but those on the inner side, giving good drainage, and three weeks later the man walked out of the hospital. No one who saw his early con-

dition expected him to recover. In another case, a boy of eighteen, we amputated at the shoulder for a similar condition. The bone was badly shattered, everything was gangrenous, but not so high in the arm. After amputation we left everything wide open in the wound, except for the gauze packing. At the end of the operation, which took only about fifteen minutes, he was apparently going under, as he had had a hemorrhage before being brought into the hospital, and had been in No Man's Land for three days before being picked up in a very pitiable condition. I stayed by his side in the operating theater until 7 the next morning, when I told the nurse to have him moved across the ward. Three weeks later he went home. It was one of the greatest pleasures that has ever come into my life to send that boy back to his parents, and I felt that my all-night vigil had been well repaid.

I could tell you, if time permitted, much of the many interesting ophthalmic cases which often presented the sad side of the work in the often-resulting blindness. In many instances the injuries have involved the destruction of both eyes and surrounding tissues, and yet have not been severe enough to cause death. The other cases which are most baffling are those of gas gangrene, and it is to be hoped that the antitoxin for the Bacillus welchii, which has been produced in this country, shall be the means of removing this scourge of modern military surgery.

I wish I might say that which would bring to you and through you to your patients and friends the full realization of the meaning of this war. The Government is performing a superhuman task. The attitude of the public at large, however, is not what it should be. We know very well that the winning of this war depends largely upon foods. The farmers must produce more foodstuffs. This requires labor, and yet if you look about you you will see thousands of chauffeurs who drive their employers for pleasure only and who could be released for such work. You see people riding about in their automobiles almost as much as ever they did, and with little concern. Someone must make all such people realize that this war is the most serious business that has ever come into our lives, and that, besides giving of our time and labor, there

must be sacrifices by the people of this country such as they have never known before this conflict can be carried to a successful conclusion.

The Harvard Surgical Unit with its hospital, one of a group of five base hospitals, was early in the war, caring for 2300 beds, and in a short space of time was receiving its quota of the men, with their ghastly wounds, coming by the thousands from the trenches which in the first part of the war were filled with mud and water and slime. The spirit of coöperation with which the nurses and doctors have done this work is perfectly wonderful. To a certain degree I found the same spirit upon inspecting some of the cantonments in this country, which work I have done for the Surgeon-General's Office. The medical men who have gone into the war realize that coöperation is required to secure efficiency, that every man must put his shoulder to the wheel and be ready to do the best for the good of the country. Every medical man who enters the war must remember that he is first, last and all the time a doctor. No difference whether he is an ophthalmologist or other specialist, if he has ever been capable of doing minor surgery he must turn his hand to it. If he has done sanitary work he should be ready to do that. There is a sad instance in this country in which a special surgeon refused to "carry on" because he was appealed to to take care of a few cases of measles. Perhaps he did not know the latest methods of treating this condition, but he could have gone in and done his "bit" to the best of his ability when in that particular hospital there were many hundred such cases. He was not willing, however, to give up his prerogative of being a specialist. Let me restate, with all possible emphasis, that the one thing which the doctors who go into this war must remember is that they are in for the good of the service and the country and not for their own individual advancement or preference.

## DISCUSSION

Dr. T. B. Holloway: It is almost futile for one to attempt to discuss a subject of this kind, and especially the interesting work which Major Greenwood has had the opportunity of doing on the Western front, unless he has had a similar experience. I am sure we have all enjoyed the pictures and have benefited by seeing a number of things of which we were ignorant in the actual working of a base hospital.

Major Greenwood has referred to the transverse wounds inflicted by missiles of various kinds. I am sorry he did not have an opportunity to discuss more fully those interesting transverse wounds passing through the orbit and air-passages. Ormond has recently stated the interesting fact that certain of these wounds, especially those traversing the air cavities, are at times much more dangerous than they at first appear to be, because of the very late development of meningitis and brain abscess and not infrequently insanity. These complications may develop even several months after the time of the injury.

I am sure had Major Greenwood cared to do so, he could have given us a number of interesting results concerning head injuries in regard to the field phenomena. In reference to wounds of the occipital region, it is well known that until recently our knowledge of macular projection in the occipital region has been in a more or less chaotic state. By some observers it was thought to occupy the posterior portion of the calcarine fissure; by others, the anterior. Lister and Holmes have confirmed the observations of a Japanese, and found from a careful study of the fields that the macular region is doubtless represented at the tip of the occipital lobe either on the lateral or mesial surface. While these cases of gunshot injuries are not ideal from the standpoint of cerebral localization, others aside from those already referred to have confirmed these clinical observations, which, under the existing circumstances, were very carefully made. The striking feature in certain of the cases that have shown a quadrant defect has been that the superior quadrant has persisted, *i. e.*, that there has been an inferior quadrant defect. This has been explained by the fact that in most of the cases that have survived, the wound has involved the upper lip of the calcarine fissure which represents the upper half of the retina. In those cases involving the lower lip of the calcarine fissure the wound has come in much closer proximity to the cerebellum, and death has probably resulted.

Major Greenwood (closing): Dr. Holloway has pointed out a very interesting phase of the subject in stating that most of these quadrant defects are in the lower temporal field. Most of the hemianopsia defects follow the so-called furrow or gutter wound, a very interesting phase of the wounds produced by high-velocity bullets passing through the scalp.

I have had the privilege of operating upon a great many of these cases and have studied the fields with much interest. I have seen many men come into the hospital with a small wound across the back of the head where a high-velocity bullet has passed. Upon cutting out such a wound ready to suture it, you find that the periosteum has not been injured. I have seen other cases in which the outer plate of the skull showed no injury but in which the periosteum has been broken; others with but a little scratching of the bone. Within twenty-four hours after suturing the wound, examination with the ophthalmoscope will often show a beginning optic neuritis which will often pass into a complete choking of the disk with, later, the development of convulsions. The minute you find a beginning optic neuritis in any of these furrow wounds you must go after them and open the skull. You must remove the splinters of the inner table and then look at the dura. If it is non-pulsating, a free opening should be made and from beneath will roll out the torn brain substance or a clot of blood. In one case trephined by Captain Burrows the dura had been pressed in half an inch by a clot of blood beneath the bone, and there was only a slight trace of hemianopsia after recovery. Certainly, the furrow wounds give a group of cases particularly interesting to the brain surgeon and to the ophthalmologist.

On behalf of the Surgeon-General's Office I may say that a large number of hospitals for the rehabilitation of the maimed are already under construction for this particular purpose, most of them being situated along the Coast. The personnel of these hospitals is being selected with the view to the best reconstruction and the rehabilitation of the injured men brought over to this country. That work, therefore, is all under way. Many types of injury come to the base hospital, some too horrible to describe, and others with a humorous aspect. You may come, as I did one night, to such a case. A wounded British Tommy came in with one eye bandaged. When I asked what the trouble was he said: "Oh, nothing much; I got my glass eye broken." He had been entered at the base hospital as a severely wounded man. There are cases in which but slight injury follows the high-velocity bullet passing through the body in certain places. Such an instance was seen in a case in which the bullet had entered the left malar bone and passed out through the right mastoid. The Scotchmen who came to us in the base hospitals impressed me as being the finest type of soldiers the world knows today. In the base hospital in 1915 there were a number of Scotchmen belonging to two regiments. Of one, only forty men, and of the other, sixty men were left after one of the battles. This will tell what they had to go through to get out of the trenches to attack and how severely wounded they were. I can say that the Scotchmen make the finest soldiers and also the finest patients one can meet.

# RECLAIMING THE MAIMED IN WAR[1]

By Major R. TAIT McKENZIE, R.A.M.C.

I have shared with you the privilege of hearing and seeing a most vivid picture of life at an advanced base hospital in France. I have also been much interested in what Major Greenwood has told us about the necessity of men, no matter whether they have or have not special knowledge, adapting themselves to the conditions of military life. This brings to my mind the spring of 1915, when I presented myself at the Surgeon-General's Office in London, and when during the course of the preliminary examination I mentioned that I had had some special training in physical therapy, the examining surgeon was not cordial, he said that if they listened to all the men who were specialists they would get nowhere at all. At Aldershot I gained some insight of the work done by the Royal Army Medical Corps, which has been spoken of so favorably and so beautifully by Major Greenwood, and I agree with him that the work was of an exceedingly high order. Although you have heard that the work of the base hospital is to treat these men surgically, the aim of the average officer in command of the base hospital seemed to be to get his beds empty just as quickly as he could to be ready for the tremendous number of men who might suddenly need urgent surgical attention.

At first the man leaving the base hospital was passed on to one of the Red Cross hospitals scattered throughout the country, where he was treated by the local physician, where he was nursed, very often, by the lady of the house and her friends, and rapidly and

[1] Read February 7, 1918.

inevitably spoiled by hero worship and by general indulgence. In order to stop this demoralization of fine men it was found necessary to establish not only hospitals but great convalescent camps in which the men were kept under military discipline and received treatment directed to putting them into condition for the front, or, at least light duty. These camps had a capacity of from 4000 to 5000 men, and provided for a variety of conditions. There were, first of all, the nerve cases, men suffering from "shell shock," which is, of course, a very elastic term, covering both mental and circulatory disturbances. Then we had the debilities following dysentery and occasionally typhoid. There were innumerable wounds of all parts of the body and of all degrees of severity.

If at the base hospital in France it is found that a man required prolonged treatment he crossed the Channel and went into a great base hospital somewhere in England. From there he went to a convalescent hospital and then to a command depot or physical training camp, where he was put into condition to rejoin his battalion and return to the front. If he was never likely to be put in condition for active service he was kept under military control, note being taken of his profession or trade, with the idea of returning him to civil life as a self-supporting man. In Canada, under the Department of Soldier's Civil Reëstablishment, he may be sent directly to his home or sent for vocational training. If further treatment is required it is given in a special hospital. In the Command Depot at Heaton Park the officers were practically all men who had been wounded or men over age. The wounds of these officers were interesting: one had a fragment of shrapnel in the heart. One officer had part of the hand off; another had lost an eye. We had a staff of masseuses and medical officers, and in addition four civil practitioners to care for the casual sick. Four men blinded in action did splendid work as masseurs.

We had to improvise many of the means for carrying out our treatment at first. One of the huts we turned into a hydro. It contained a pool bath filled with water at a temperature of 94°. Cases suffering with irritable heart, respiratory disorders and mental disturbance, the result of shell shock, were greatly bene-

fited by these baths. Progressive gymnastic exercises also form a part of the treatment for these heart conditions. The whirlpool bath, also used, was introduced by the French. It was used in the treatment of painful scars and painful nerve conditions. It was a frequent and very distressing occurrence to see men coming in with a wounded arm blue, cold and very painful. Massage alone was quite impossible. With the limb in the arm bath for about twenty minutes at a temperature of 112°, the blueness disappeared and the greatest possible relief was gained. Men who had not been able to sleep were made comfortable and massage and other treatment made possible.

In the early part of the war there were many injuries from the hand grenades which were often caught by the men in the endeavor to return them before they exploded. A picture of a hand stump was shown.

We used the faradic current for muscle testing and muscle development. The galvanic current and ionic medication were also employed. In cases in whom a piece of shell has taken away part of the muscular tissue of the arm or thigh, ionic medication with saline solution and radiant heat were frequently used for the scar. The small hinged shoulder bath was of value in preparing the region for massage.

Massage is twice as effective if the part is well prepared by hot water, radiant heat or electricity. Some badly contracted scars were treated by radiant heat rather than by the whirlpool bath, when they showed a tendency to become sodden and break down. If, however, radiant heat and massage are persistently applied about the region of the scar it can almost always be slowly and progressively loosened and softened.

Ionic medication is also used for the softening of scars. In a large number of stiffened joints we found it very useful to have some means of recording the amount of movement gained. Some of the pictures showed devices for measurement.

Because of the great number of wounds affecting the hand and arm there is more necessity of devising appliances for developing the various movements of this member than for any other part of

the body. In devising machines we made it a rule to keep all stretching movements under the control of the patient as much as possible. If this control is held by the patient there is no danger of overstretching or tearing an adhesion which would make the last end of the condition worse than the first.

For the more skilful movements we used the pulley and weight a good deal. The exercises were arranged in a series including stretching and voluntary movements, and were done in a definite order. The men then organized in classes of ten or twelve at a time. Afterward they were given gymnastic exercises in classes of thirty to fifty. The pictures illustrated the organization which was necessary in the carrying out of this varied treatment. Provision was also made for deep breathing exercises, applicable mostly to the gassed cases, for balancing exercises to steady the nerves of the shock cases and restore their sense of equilibrium and their courage. On alternate days the men were sent off on a two-mile march. We got them up to a six-mile march, which we considered sufficient to return them to their reserve regiment.

The pictures illustrated the kind of cases met with. One showed ankylosis of the elbow with atrophy, the result of too prolonged splinting. With passive and then active motion there was good recovery. Another showed a case in which the bullet entered and shattered the scapula, causing a jagged wound. Although this was in a powerful man, he was unable to carry his pack, and so was unfit for active service. In another case a high-explosive shell lacerated the whole of the man's back, destroying some of the spinous processes. We used radiant heat and massage, and the man made a complete recovery. Another illustration was that of a man who was buried in the trench by timbers, producing paralysis of the abdominal muscles. Faradic stimulation of the paralyzed muscles with muscular exercises brought about a good recovery. Another picture showed one of the few instances we had of malingering. This man's hand was badly swollen every morning and a little investigation showed a bright red mark on the upper arm, where he had tied a cord around his arm during the night and let the arm hang out of the bed.

A few of the pictures were illustrative of the metal facial masks made to cover the deformities and enable the men to go about without attracting attention. Many of the men so disfigured become morbid because of the horror which they seem to incite, and some in their depression have even committed suicide. Plastic surgery has done much for these men; but in cases in which the nose is completely destroyed a cast is made of the face. A new nose is modelled in clay, and from a cast of this an artificial nose made of copper, silver plated and tinted to blend with the skin. It is usually held in place by a pair of glasses or by spirit gum. By such means the man is enabled to return to his work. In the loss of the arm there have been made many successful devices, or "salary hooks," as they are called. Artificial legs are also supplied and trades taught, so that many men coming to the hospitals are sent back with a vocational training which they before lacked, and thus a wound may be really a blessing in disguise.

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## DISCUSSION

Dr. G. G. Davis: I think we are exceptionally fortunate in having this subject brought to our attention by Dr. McKenzie, who is especially interested in it and therefore qualified to be identified with its development. It seems that it has remained for a war to bring us to our duty. From what we have seen here tonight it is evident there is a tremendous amount of work to be done for these soldiers after they have been returned. As I understand the matter, the proportion of those requiring prolonged after-treatment to those who are wounded is from 30 to 50 per cent. Now, these cases will not be treated over there because their home is over here, and the burden of their treatment will fall upon us. How are we preparing to take care of them? In the first place the hospitals began by taking care of the wounded in civil life. They were largely places of refuge for cases of accidents. As surgery was developed the scope of the hospitals was enlarged. As in the military hospitals so it is in our civil hospitals, the custom is to pass the patient through the hospital as soon as possible and the community has failed to provide for the treatment of chronic cases. Since the establishment of industrial insurance and the require-

ment of the employer to pay for the length of time the employe is disabled the demand has arisen for proper treatment of the chronic case. When from the war large numbers of disabled people are thrown upon the nation the authorities wish to see these cripples either returned to the front or dismissed from the army. The community does not look with equanimity upon the prospect of a large number of disabled people being thrust upon it without means of support. Therefore the demand has arisen for treatment and it finds us unprepared in our civil hospitals. It is well that such a man as Dr. McKenzie comes here and shows us plainly with what we are liable to be confronted. The Government has appreciated this to a large extent and efforts are being made to meet the need. Our civil hospitals have not the equipment to care for the maimed coming back from the war. An enormous amount of preparation will have to be made, and I am sure will be made. With the knowledge gained abroad by such men as Dr. McKenzie to meet this issue we surely ought to be able to do creditable work. It will only be by the greatest effort that we shall be able to care properly for our wounded. However, I am an optimist, and I believe we shall do the work. There must be however, an appreciation by the public of the work to be done and of the necessity of aiding in every possible way. There has been a woeful neglect of cripples in civil life. In a calamity like the present war the public should realize that a very large number of cripples, if properly cared for and trained, can be made self-supporting in whole or in part.

Dr. A. B. Hirsh: One point touched upon by Dr. Davis regarding what shall be done along the line of repair for these men returned from the war might be slightly elaborated. Last June a committee from the American Electrotherapeutic Association visited the War Department and the Council of National Defense at Washington to answer the inquiry of these Departments as to what should be done for such crippled men. Other national specialist organizations were represented by similar committees. As a result of the conference, in November last, six months later, orders went out from Washington for establishment of definite groups of physicians, limiting their practice to physical methods, for each of the different war hospitals of the country. Questionnaires were sent to men known to be working along reparative lines asking how much service they would render, whether full time in the field, or full or part time at home. These completed questionnaires are now in the War Department, and the understanding is that each hospital will have a definite set of practitioners capable of directing orderlies to carry out treatment, as described by Dr. McKenzie, in methods such as electrotherapeutics, hydrotherapy, massage, etc. Of course, the question arises

whether the profession can at present supply a sufficient number of men capable of such duty. The Government, to remove this doubt, is about starting a training school or postgraduate course in the Walter Reed Memorial Hospital in Washington for the benefit of men assigned to military duty for this purpose. Probably similar schools will be established elsewhere in base hospitals so that by intensive training, in the course of a few months, the number of men capable of treating these cases or directing their treatment by physical methods will likely be ample.

Dr. James M. Anders: I am sure we are all very much interested in this series of papers. I was particularly interested in Dr. McKenzie's address upon the subjects of physical repair and the reëducation of the soldier. Notwithstanding his description of the elaborate methods and means for physical repair of the mutilated, it seems to me that the work of reëducating these men is even more difficult than their physical repair. I have read in one of our Journals that in England about 80 per cent. of those physically rehabilitated are returned to active service. I should like to ask Dr. McKenzie who has been identified so closely with the work abroad whether this is borne out by his experience. In many cases the reëducation of men is a difficult problem; they cannot resume their usual occupations, a fact mentioned by Dr. McKenzie. In such work the idea should be kept in mind that the men should be fitted for an occupation as nearly as possible on a par to that given up when they entered the army, and one which will give them an equal financial return, carrying with it equal rank and importance. It is the purpose of our government as I understand to establish permanent reconstruction hospitals in this country and after the war to transfer them to the civil authorities. If the aims of General Gorgas in relation to the question of the rehabilitation of our soldiers can be brought about, then it seems to me that the labor question will be in large part solved, and that we shall have in this country after the war a minimum of cripples and, what is of equal importance, permanent institutions for industrial reconstruction.

Dr. McKenzie (closing): In answer to Dr. Anders concerning the number of men returned to active service, we returned to the front line about 40 per cent. of the men, about 17 per cent. back to the lines of communication and about 15 per cent. to clerical work at home; so that, for military purposes, we returned perhaps 70 per cent. I may say, however, that the percentage sent back depends largely upon the need of men at the front. In England now, where there is a call for 500,000 men, every man who can carry a gun will undoubtedly be sent back. Here where there is and will be an abundance of men I think the percentage

sent back will be very small. It must be, therefore, always a question of supply and demand. In the convalescent hospitals and camps there will be a vocational officer whose duty it will be to ascertain a man's qualifications and preferences in reëducation that these may be adapted to his ability and desire. Usually these hospitals are established near to a university or other institution of learning. For example, in Montreal they are located in close proximity to McGill University. In farming countries the men take up such occupations as chicken and truck farming, bee-keeping, etc. I believe that only about 7 per cent. of the men need to learn a new trade. There is always the tendency among men to choose an occupation that will keep them in the city. The great endeavor of the Government has been to prevent this. Nearly all the men without a trade want to become operators in a moving-picture show. They are so accustomed to life in the crowd that they are unhappy if they are alone.

I was very much touched by the tribute to the Highland regiments paid by Major Greenwood, and it reminded me of a letter which I received recently from a friend who had been visiting a hospital, telling of a young Scotchman fatally wounded by a shell. He said to her: "I was twice gassed at Ypres, once badly. I was sore wounded in the side, and I had my leg broken and my arm hurt, and they put me out of the Army three times because I was under age; but" he said, "I ay got back." When you meet men with a spirit like that I don't think there is anything that can equal it in inspiration—or surpass it in courage and devotion!

# PEPTIC ULCER[1]

By JOHN B. DEAVER, M.D.

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There is probably no subject that is more frequently discussed at gatherings of this kind than that of peptic ulcer and there is probably also none in which discussion has proved more valuable and instructive. Nevertheless there is still lacking a definite knowledge of the underlying causes and the mechanism of the development of these ulcers and unanimity as to the best method of treatment once they have occurred. I have on so many occasions emphasized my conviction that the basic factor in the development of peptic ulcer is infection that it seems almost superfluous to further insist upon it. The toxemic origin of peptic ulcer is generally recognized and there seems little doubt that infection is the primary cause of the toxemia in the vast majority of cases. Furthermore, clinical experience in recent years is indicating more and more clearly that the original site of the infection lies in the vermiform appendix, and Rosenow's demonstration of the elective localization of microörganisms, especially streptococci, is additional confirmation of the infectious origin of these ulcers and similar lesions. Indeed, Rosenow's studies show that the cells of the tissues for which a given strain of bacteria shows an elective affinity may "take bacteria out of the circulation as if by a magnet—absorption." From Bolton's careful histological studies we learn that the initial lesions which give rise to ulcer of the stomach are localized necrosis of the mucous membrane, localized hemorrhage and inflammation of the lymphatic follicles. The common cause of necrosis is bacterial

[1] Read March 6, 1918.

infection of its toxins circulating in the blood stream and, as pointed out by Bolton, the cells of the gastric mucosa being primarily attacked by the poisons in the circulation, necrosis is readily produced by the local action of the gastric juice. Necrosis may arise in this way without any preceding hemorrhage or lymphatic inflammation, but hemorrhage is an actual and frequent cause of ulcer and is likewise due to bacterial toxins circulating in the blood stream, which, destroying the endothelial cells of the capillaries, pave the way for the local destructive action of the gastric juice. Finally, inflammation of one or more of the lymphatic follicles, so thickly studded along the lesser curvature of the stomach, especially toward the pylorus, may give rise to a submucous abscess which, by rupture into the gastric cavity, allows the gastric juice to act on the base of the ulceration thus exposed.

Ulcers developing in one or the other of the processes mentioned would heal in a normal stomach, but being constantly exposed to the action of the frequently hyperacid, gastric juice, they show a tendency to spread rather than to heal, and sudden perforation or hemorrhage is often the first indication of gastric ulcer. Or in cases of simple ulcer the tendency is to become callous with chronic peptic ulcer as the result. There is little doubt that every chronic peptic ulcer was at one time acute and began in one of the aforementioned processes. If the early symptoms are sufficiently pronounced as to demand and *receive* attention the ulcer may heal, but owing to their insidious character these ulcers do not, as a rule, present early definite symptoms, and the longer they remain unhealed, especially if situated on the lesser curvature near the pylorus, the less amenable are they to medical treatment. In fact, it is doubtful whether a true peptic ulcer, as distinguished from an erosion, ever heals under purely medical treatment. The so-called cures represent a latency which, there is no telling how soon, is apt to be aroused to activity. It is, of course, rather difficult exactly to estimate the relative proportion of medical and surgical cures of peptic ulcers. But we do know, as Coffey[1] aptly remarks, that every

[1] Surg., Gynec. and Obst., 1917, xxiv, 350.

case that comes to the operating table represents a medical failure and perhaps several failures on the same individual. The frequency of such failures is readily seen by the increasing number of operated cases that are reported from the larger hospitals throughout the country. In my own experience I have operated on 73 peptic ulcers during the year just passed compared with 60 during the year 1916, an increase of 18 per cent. There is, to be sure, no way of telling whether this increase is the result of a wiser counsel prevailing among internists as a consequence of the more or less forcible arguments presented by the revelations of the operating theatre as to the better method of treating peptic ulcers, or whether it is due to an actual increase in the incidence of this form of gastro-intestinal disturbance as the result of modern living conditions. To attribute it to a combination of the two factors would probably provide unction for both the surgeon and the internist. Be this as it may, there is little doubt that the improved diagnostic aids at our disposal have to a large extent led to a greater degree of certainty in diagnosticating the presence of deformities and functional derangement of the gastro-intestinal tract, for the greater number of which surgery is the only rational treatment. With the aid of the *x*-rays and the various clinical tests, and a carefully taken history, a correct preoperative diagnosis of ulcer has been made in 88 per cent. of our cases during the past year.

As it is, we surgeons are free to confess that we have not yet attained the ideal of 100 per cent. of cures by our methods. We are still being confronted with a sufficient percentage of recurrence of symptoms after operation to keep us humble, even though we can claim that from 75 to 90 per cent. of operated cases are either completely cured or so greatly benefited as to require no further medical treatment. Of our patients operated on for peptic ulcers during the past eighteen months, 90 per cent. of those traced reported complete cures.

Recurrences indicate primarily that a certain number of cases have by operation been merely placed in a *status quo ante* as to their liability to develop peptic ulcer, and secondarily some fault in the method of operation.

For a chronic ulcer of the duodenum we believe that excision of the ulcer is the best method of treatment. If the ulcer is easily accessible, which it usually is if located on the anterior or outer wall of the bowel, its complete removal by excision presents no difficulty. But where there is marked and extensive induration complete excision of an ulcer is not always an easy operation; indeed, it may be a dangerous one except in the hands of the experienced abdominal surgeon. The occasional operator in such a case had better content himself with a gastrojejunostomy. For a time it was our practice in treating ulcers located low down on the duodenum to excise the ulcer and implant the duodenal stump into the head of the pancreas. But our experience has been that in two instances the digestive action of the pancreatic juice has resulted in the formation of duodenal fistulæ necessitating a secondary operation. We have therefore abandoned the practice, and in such cases we now do nothing to the ulcer but infold the wall of the duodenum and adjacent gastrocolic and gastrohepatic omentum over the ulcer and make a gastrojejunostomy. The latter procedure, in fact, is considered by Moynihan and others as of itself sufficient for the cure of duodenal ulcer. While we consider it an integral part of the treatment of all ulcers of the duodenum, we believe that the surgeon's first effort should be directed toward the removal of the diseased area, and that gastrojejunostomy as a supplemental operation though generally effective in preventing a recurrence, cannot always be relied on of itself to cure a fully developed chronic ulcer.

Not only is it necessary to treat the ulcer at the time of operation, but it is equally important to endeavor to discover the focus of intra-abdominal infection that is the real offender in the case. It is therefore essential to inspect the biliary tract and drain or remove the gall-bladder, according to existing conditions; the frequency of an accompanying pancreatitis should be borne in mind in this connection. In our cases during 1917 we found disease of the biliary passage present in 16.3 per cent. of chronic peptic ulcers.

Above all we should not omit the removal (unless contraindicated, which is rarely the case) of the appendix, that obnoxious

organ which is the most constant source of intra-abdominal infection. We are fully in accord with Moynihan when he says that the commonest site of gastric ulcer is in the right iliac fossa, and that "in the majority of cases in which the most erudite teaching of the most astute German physician would justify or compel a diagnosis of ulcer, the patient is often suffering from a lesion elsewhere and more often than not in the appendix." The appendix can be removed either through the same incision as that used for the exposure of the upper abdomen or through a separate McBurney incision. We prefer the latter method.

Excision of a gastric ulcer would be as desirable as it is for ulcer of the duodenum were it always as safe and always feasible. While we consider it best suited for ulcers located at some distance from the pylorus, we do not hesitate to say that it should be the operation of first choice in indurated ulcers, irrespective of location, that is to say, pylorectomy or partial gastrectomy for pyloric ulcers, wedge-shaped or circular resection of ulcers on the lesser curvature, for ulcers on the posterior wall, transgastric resection or resection by way of the entero-coloepiploic route. By this same route ulcers on the posterior wall of the duodenum adherent to the pancreas, with few exceptions, are rendered accessible and amenable to excision. We would add, however, that a conservative selection of cases is essential, and excision should be attempted only in the absence of encumbering adhesions and where the patient seems able to withstand what often proves to be a rather tedious operation. Ulcer on the posterior wall of the stomach invading the coats are best exposed and disposed of by dissecting the gastrocolic omentum from the transverse mesocolon, lifting up the great omentum when the entire posterior wall of the stomach may be beautifully shown, also the duodenum and pancreas. This exposure very materially facilitates access to ulcers that otherwise would be difficult to deal with. Destruction of an ulcer by actual cautery is a method originated by Balfour at the Mayo Clinic, where it has been done with marked success. We have had no experience with this method of treating gastric ulcers.

A careful selection of cases is also essential for the success

of pyloroplasty, as advocated by Finney. While in his hands the immediate mortality has been lower than for gastrojejunostomy (5 and 7 per cent. respectively)[1] this is not the experience of most surgeons. Finney also reports better end-results from his operation than from gastrojejunostomy (93 and 94 per cent. cures, respectively). We believe that Finney's method of pyloroplasty should be employed only when gastric motility is good, where perigastritis is absent, and where the pylorus is not involved in cicatricial tissues. As there are few cases presenting these favorable conditions, the operation would have only a limited application. Adhesions are nature's safeguard and should be treated with respect. In not a few instances adhesions represent barriers guarding a threatening perforation or an area of a previous chronic or subacute perforation. Injudicious destruction of such adhesions may open up a perforation into the stomach, which may not be amenable to closure by suture and will also subject the patient to the risk of septic peritonitis from the unexpected and sometimes undiscovered extravasation of gastric contents. The safer course, we believe, is to do a gastrojejunostomy in a healthy stomach wall and let nature's barrier remain undisturbed. The more marked the pyloric stenosis the more certain are the benefits to be expected from gastrojejunostomy; furthermore, where the pylorus is much obstructed it is also involved in cicatricial tissue, an extremely unsuitable site for incision and suture. Stitches, as we all know, do not hold well in scar tissue, nor does it lend itself so well to an anastomotic operation as does normal tissue, both because of its rigidity and its lack of blood supply. Still, where the pylorus is an obstructive factor without being ulcerated or the seat of cicatricial tissue, Finney's operation may prove of value.

On the other hand, gastrojejunostomy has been proved by clinical experience the best standard of success, as admirably fulfilling the surgical requirements for the treatment of gastric ulcer. The death-rate is low, collected statistics place it at not more than 10 per cent., and in the hands of some surgeons it is

[1]Am. Jour. Med. Sc., 1915, cl, 469.

negligible. There were no deaths in our cases of gastric ulcer operated in 1916–1917 treated with posterior gastro-enterostomy as a combined or as the only operation. The end-results also of the operation in the treatment of pyloric ulcers where there is no pyloric obstruction are most satisfactory. While it is not always the best procedure for all ulcers located elsewhere in the stomach, it is even in these undoubtedly the least dangerous and the most generally applicable operation in the hands of those who are not doing many operations for excision. If the anastomosis is made, not in the fundus of the stomach but in the pyloric antrum, the anastomotic opening will functionate even when the pylorus is patulous and even though the gastric contents do not leave the stomach through the new opening but are still being discharged through the pylorus, gastrojejunostomy is a curative measure for the ulcer, in as much as it reduces hyperacidity by permitting admixture of the bile and pancreatic juices with the stomach contents.

The question of exclusion of the pylorus as an aid to gastro-enterostomy in the cure of gastric ulcers is still a matter of discussion. We believe that the only theory on which it can be held of value as a primary operation is that which teaches that gastro-enterostomy is of benefit not because (as has been hitherto considered its most desirable effect) it admits an excess of alkaline duodenal secretion to the stomach, but by merely accelerating the evacuation of the stomach it lessens the time during which peptic corrosion of the ulcer can take place. Sippy[1] supports this view, arguing that pepsin acts only in acid medium and as the acidity of the gastric juice depends largely on the presence of food in the stomach, the only good gastro-enterostomy can do is to accelerate the evacuation of food from the stomach; as long as the pylorus is even partially open little or no gastric contents will pass by way of the new opening, and it is therefore of little value; but if the pylorus is occluded (by stenosis from ulceration or by ligation or plication, etc.) then the new opening serves for evacuating the stomach and does so in less than the normal time. We

[1] Jour. Am. Med. Assn., 1915, lxiv, 1625.

believe that Sippy overlooks the fact that in duodenal ulcer the stomach is often emptied through the pylorus in less than the normal time, and nevertheless the addition of a gastrojejunostomy promotes the healing of the ulcer without further accelerating the evacuation time; the only reasonable conclusions thus, it seems to us, is that the value of gastro-enterostomy lies in the increased alkalinity of the gastric contents obtained by admitting to the stomach through the anastomotic opening the alkaline duodenal secretions. Therefore, it seems doubtful whether primary occlusion of the pylorus is of any value.

Vicious circle following gastro-enterostomy is a very unusual occurrence in these days, but so-called marginal ulcers developing around the gastro-enterostomy opening are unfortunately still being recorded, although the percentage of cases is small. During the past two years we have had occasion to treat four marginal ulcers. In two instances the original operation had been performed by us at the Lankenau (formerly the German) Hospital of Philadelphia. The histories of these two cases follow:

M. D., female, aged forty-seven years. Operated April, 1907, for gastric ulcer, hour-glass stomach and cholelithiasis. Operation consisted of gastrogastrostomy, posterior gastro-enterostomy and cholecystostomy. Recovery was interrupted by phlebitis. The patient was well until January, 1915, when she suffered a severe attack of sharp epigastric pain, which came on immediately after eating. There was nausea but no spontaneous vomiting. Relief was obtained by self-induced vomiting. Several similar attacks followed this one, but none were so severe as the first one. She also gave a history of occasional hunger pain relieved by food. Bowels costive and stools dark. Occasional dry cough. Loss of weight thirteen pounds in four weeks.

*Operation* April 17, 1916. Stomach exposed, adhesions around the latter separated. Old gastro-enterostomy opening patulous. Subtotal gastrectomy was done with Roux-Y anastomosis. Recovery.

There was no reply to the inquiry sent concerning the ultimate result of the operation.

H. A., male, aged twenty-eight years. Operated April, 1915.

An ulcer was found on the second part of the duodenum. Duodenum was plicated over ulcer, after which a gastrojejunostomy was done. The appendix was removed through a McBurney incision. It contained many fecal concretions. Uneventful recovery.

The patient was well for four months, when periodic attacks of epigastric pain returned. The pain was cramp-like but not severe, and had no definite relation to eating. No nausea and no vomiting. The patient was re-admitted to the hospital, February 2, 1917. About eighteen hours before admission he was seized with a severe attack of pain. Examination showed slight rigidity and distention of abdomen; peristalsis present. *X*-ray examination revealed partial constriction at the gastro-enterostomy opening. At operation (February 8, 1917) the margin of the gastro-enterostomy opening was found indurated and an ulcer presented at 1 cm. on its upper border. Duodenum patulous. A section of the stomach with the jejunum comprising the former anastomosis was excised, the opening in the stomach closed and a new Roux-Y anastomosis made. This patient reported no further digestive troubles ten months after operation. Recently I have operated for perforated jejunal marginal ulcer occurring after a Roux-Y operation in a subtotal gastrectomy. The latter operation was done for a marginal ulcer following a simple gastrojejunostomy for duodenal ulcer.

One of the most serious, if not the most serious, menace of chronic peptic ulcer is, of course, perforation. This complication is generally said to occur in about 4 per cent. of all cases, but the proportion is much greater if we consider only those cases that come to operation. For example, in the entire series of operations for gastric and duodenal ulcer at the Lankenau Hospital of Philadelphia during 1916 and 1917 there were 13 acute perforations (3 of gastric and 10 of duodenal ulcer), or 10 per cent. of the entire number ulcers. All of the patients recovered, operation having been performed in from two to eleven hours after onset of symptoms; in one case three days had elapsed between the first symptoms and the operation.

About 70 per cent. of perforations occur from ulcers on the anterior wall of the stomach, those on the anterior wall toward the pylorus forming about 80 per cent. of the total. About 18

per cent. occur on the posterior wall while the fundus and the cardia are very exceptionally the site of perforating ulcers. The anterior wall of the stomach being exposed to the general peritoneal cavity, and also subject to a greater degree of dilatation and contraction than is the posterior wall, and is also more exposed to traumatic influences. On the other hand, the posterior wall is more rigid and more protected, ulcer developing at this site is more liable to develop perigastric adhesions as soon as any peritoneal irritation occurs; thus reinforced it is neither so apt to perforate, nor in the rare event of actual perforation is it so likely to induce peritonitis.

The diagnosis of perforation of peptic ulcer is not a matter of great difficulty, and in typical cases it is easily made by the hospital interne of average experience. The dominant symptoms are acute, overwhelming pain, vomiting, fall of temperature, rise of pulse, shock occasionally and peritoneal reaction, *i. e.*, early rigidity followed in from ten to eleven hours by distention. The differentiation between perforation of a gastric or a duodenal ulcer is not possible, as a rule, nor is it essential, for the treatment for either or both is surgery, and the earlier the intervention the better the prognosis.

Excision of an acute perforating gastric ulcer, in our opinion, is not only an unnecessary waste of time but it gives the surgeon a larger opening to close, and, in addition, by the possible dividing of a large vessel, it presents the risk of adding hemorrhage to an already desperate condition. Seromuscular suture of the perforation with linen, without attempting to freshen its edges, is sufficient. There are, to be sure, cases in which it is not possible to close the opening securely by suture; in such instances the perforation may be closed by suturing a tag of omentum over it or the gastrohepatic omentum may be anchored down to the perforation or the perforated area may be packed off with gauze, as is done in other parts of the abdomen. Drainage is imperative. In perforated duodenal ulcer our procedure can be briefly summarized as consisting of closure of the perforation, plication of the duodenum to obliterate its lumen and fortifying the area by covering with gastrocolic and gastrohepatic omentum, posterior no-loop

gastro-enterostomy and drainage of the pelvis through a suprapubic wound. This should be done in all cases whether or not the epigastric incision is drained. Although in most cases in which operation is done within twelve hours after perforation the peritoneal exudate is sterile, it is not always so, for the colon bacillus in pure culture has been found in the pelvic exudate within less than five hours after perforation of a duodenal ulcer, although clinically there was nothing to distinguish this case from others in which the exudate is sterile. (Ashhurst, personal communication.)

We strongly disapprove of irrigating the peritoneal cavity even in late cases in which particles of food can be distinguished in the exudate. Merely wiping away with moist gauze the small particles of food that are accessible gives the case a much better chance of recovery.

Primary gastrojejunostomy as a part of the operation for perforating gastric or duodenal ulcer is becoming more and more recognized as a useful procedure in properly selected cases and in the hands of the surgeon accustomed to working within the abdominal cavity.

Most surgeons agree that when closure of the perforation produces stenosis of the pylorus, gastrojejunostomy as a primary operation is advisable. But we believe it suitable to all cases of gastric ulcer unless there is specific indication to the contrary. We have not had any cause to regret our practice, which is not the case with surgeons who have omitted the operation in certain instances. Paterson,[1] for example, states that among the cases of gastric perforation collected by him no less than 13 deaths in 58 cases could have been avoided had a primary gastro-enterostomy been done. Indeed, Paterson goes farther than we should be inclined to go in stating that even purulent peritonitis is no contra-indication to the operation. Caird[2] was obliged to do the operation three days after suture of a perforation on account of stenosis of the pylorus; Allingham and Thorpe[3] resorted to it

[1] See Deaver and Ashhurst: Surgery of the Upper Abdomen, i, 127.
[2] Edinburgh Med. Jour., 1914, lxiii, 1184.
[3] Lancet, 1904, ii, 886.

one month after operation in order to hasten convalescence; Scudder found it necessary five weeks after and Gibbon[1] eighteen months after suture of a gastric ulcer.

For perforating gastric ulcer also we advocate primary gastro-enterostomy. Early operation is a vital factor in the prognosis of these cases. We do not consider shock, unless severe, as contra-indicating operation; yet if it is a question of immediate operation it may be one for careful consideartion. Shock, it appears, is to a great extent due to the evacuation through the perforation of gas and intestinal contents, and the sooner the peritoneum is opened to allow the escape of the gas and the extravasated matter and the sooner the perforation closed the better for the patient. If the duodenum is bound down by adhesions and the site of the perforation is not easily accessible a large pillow placed under the lower dorsal spine, as in operations on the biliary tract, will prove of considerable assistance in bringing the duodenum nearer to the abdominal incision. The perforation should be closed with linen sutures and reinforced with a tag of omentum when necessary. Unless the peritonitis is extensive and the patient's condition is grave, we do a primary gastro-enterostomy. We also remove the appendix, examine the gall-bladder and pancreas and if either of the latter is diseased we deal with it as indications present.

In a few cases in which the duodenum was extremely friable and the perforation could only be imperfectly closed, resulting in temporary leakage of duodenal secretion and bile, we feel confident that the recovery of the patient was largely due to the gastrojejunal anastomosis. This is especially true in subacute perforation of the stomach and duodenum unexpectedly discovered at operation for a supposedly uncomplicated simple lesion. In such cases it is not always possible to make sutures hold in the region of the perforation, repeated attempts to do so resulting only in enlarging the bowel opening, while resection is entirely out of the question. The patient's salvation lies in a gastrojejunostomy.

[1] Tr. Coll. Phys. of Philadelphia, 1907, xxviii, 40.

# REPORT ON THE HOSPITAL ORGANIZATION AND SANITARY SERVICE OF THE RUSSIAN ARMY[1]

By D. J. McCARTHY, M.D.

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The almost complete absence of knowledge on medical matters connected with the Russian Army and its hospital organization has led me to present, in the form of a running report, an inspection of the middle west front, which includes one-third of the Russian front opposed to Germany, for your consideration.

I may say that a commission composed of trained medical observers, occupying high university positions in this country, went into Russia with the conception, which I think is usual, that Russian medicine, and more particularly as applied to the army, was in a stage of benighted ignorance and entirely lacking in the modern conception of the handling and treating disease. Such preconception was not only faulty in its reasoning, but failed to take into consideration the influence of continental medical thought of England, France and Germany upon the Russian problem. It likewise failed to consider Russia had had under arms for a period of three years an army exceeding ten millions of men; that in such a vast army covering such a wide expanse of territory certainly some problems would be met and solved in a relatively satisfactory manner. This was found in a general way to be true.

The experience of the Russian medical staff followed, in a general way, along the lines of the English and French, modified by local conditions and the difference in the nature of the Russian soldier.

[1] Read March 6, 1918.

Typhus fever, which would have been an extremely serious matter on the French front, received but scant consideration on account of its mild manifestations in the Russian, whereas in Germany delousing and the prevention of the incidence of lice became an extremely urgent matter. In the Russian army it was not considered of extreme importance. The presence of lice, however, notwithstanding the lax attitude toward it, was certainly not worse than in the French army during the first two years of the war. The difficulty of control of this carrier of disease was shown in the attempts of the British to control it and our own experience with the troops in the military zone.

Trench fever, which has since been shown to be transmitted by lice, was of frequent but not of epidemic occurrence. Strangely enough, the Russians linked up trench fever with scurvy.

The greatest cause of invalidism in the Russian Army was due to this disease scurvy. While there was some difference of opinion as to the cause of it, the opinion that it was due to some infection was rather widespread among the physicians attached to the army. They pointed as evidence of the infectious nature of scurvy a clinical experiment in the Murman district. Regiments in which cases of scurvy were isolated showed a small percentage of cases of this disease, whereas in regiments in which isolation was not practised a high percentage of incidence, as high as 50 per cent., occurred. These regiments were under the same sanitary conditions and supplied with the same food. Inasmuch as trench fever occurred frequently in this same area the theory of a relationship between the two diseases was natural.

The other epidemic disease of serious consequence to the army was dysentery. This was evidently not confined to any one particular type. All the bacillary types, the amebic type, hemorrhagic mucous colitis, were all present in varying degrees at various parts of the front.

Typhoid, paratyphoid, relapsing fever and smallpox were present from time to time as local epidemics. The equipment for meeting and controlling epidemics was developed to a high grade of efficiency in the Petrograd Army district. During the summer

of 1917 the lack of discipline due to the revolution seriously interfered with control of epidemics, protective vaccinations, etc.

In order to understand properly the notes of survey which I am about to present, it will be necessary to explain the relative functions of the three services having to do with the care of the sick and the wounded in the Russian Army. The work is almost equally divided among (*a*) the Russian army medical corps, (*b*) the Russian Red Cross and (*c*) the Zemstvo Unions.

The Surgeon-General of the Army had full control of the sanitary corps. He had only a relative control over the Russian Red Cross. He had the right of placing its various units and of prescribing its method of action. The Red Cross had, however, control over its own funds, its own supplies, ambulances, etc. It functioned as far forward as the first aid station in the front line positions and had its own ambulance columns, field hospitals and hospitals in the rear. On account of the control of its own funds and its own supplies it functioned more easily and freely and had much more elasticity than the Russian Army Medical Corps, which was limited by army regulations, quartermasters' rules and endless red tape.

The Zemstvo Union had an organization almost identical with that of the Red Cross. In addition to the care of the wounded it took care of the refugees and had other social service functions. These three organizations were found working side by side in the same military zone. The work was rather equally divided among the three. There was little to choose between the efficiency of the three organizations. All of them could stand a critical comparison with the medical organization of the French, the British or the Italian Armies. The organization of the Russian Red Cross was, in my opinion, far superior to any other Red Cross organization, not excepting that of Japan, which is fully and completely organized. With this explanation I will now present some notes of survey which will give some idea of the practical field work.

Tuesday, August 15 to 28, 1917. 1. Investigation was made of the headquarters of General Melvah in charge of the Red Cross activities in the 10th Army, with headquarters in Minsk. The

general plan of the office was investigated and certain appliances, such as gas masks, etc., were here studied.

2. *Red Cross Epidemic Hospital for the Middle Section of West Front.* This hospital was in charge of Dr. Leonotieff, assisted by two physicians and fifteen nurses. The hospital consisted of one large main building, a smaller permanent brick building for contagious cases, such as typhus, cholera, etc., and two or three temporary barracks. The main building was a large, airy building, with wards, isolation rooms, laboratory, etc. At the time of the inspection the majority of the cases were intestinal infection, such as dysentery, mucous colitis, etc. One wing of the hospital was devoted to a typhoid group of cases, including the relapsing type of fever. The physician in charge exhibited some charts demonstrating the value of salvarsan in relapsing fever from and the treatment of this latter disease. In the isolation building, adjoining the main building, cases of typhus. In the third building cases of dysentery from the civilian population were housed.

The following diseases were accepted in this hospital: Typhoid, paratyphoid, typhus, typhus recurrens, malaria, dysentery, hemorrhagic mucous colitis, smallpox, anthrax, scarlet fever and skin infections.

In one of the temporary barracks a school for orderlies (feldschers) is housed. This type of trained orderly, whose training extends over one year in times of peace, is permitted according to the Russian system to practise medicine in villages, and in time of war acts as an assistant to the physician in dressings, in operations and, on his own account, is permitted to do minor operations, setting fractures, etc., in emergencies. This school was in session at the time of the inspection. This department was in need of anatomical diagrams and charts. If any attempt is made to supply these they must needs be with Russian legends. Attached to this hospital at the present time is a field railway laboratory, housed in a railway coach. At the present time the laboratory work of the hospital is done in this car. A student and a laboratory assistant was here employed to assist the house staff in their investigations. The explanation given for the presence of this car, kept here

evidently as a permanent laboratory, was that while it was primarily intended for service and epidemics at the front there had been for some time no need for it. Two cars for purposes of disinfection were also found on this railroad siding on the hospital grounds and were used for disinfection purposes connected with the hospitals. In addition to this there were several portable disinfection apparatus of the Russian Red Cross type housed on the hospital grounds. The general sanitation, sewage disposal, fly protection, etc., is considered under Addenda Numbers 3, 4 and 5.

3. *The General Storehouses of the Russian Red Cross for the Supply of the Middle West Front, Located in Minsk.* This storehouse is in charge of (Prince) General Amaporine. These storehouses occupy one large warehouse, several smaller barrack types of buildings and a large barrack for the personnel. In this large building was found large quantities of stores of all kinds: General provisions, flour, buckwheat, cereals, sugar, condensed milk, bread, medical supplies, medical apparatus, hospital supplies, hospital beds, etc. On the grounds a well-conducted bakery was in operation. This supplies the bread for the personnel and also some of their own hospitals. In another building an equipment for the manufacture and repair of a horse type of ambulance was installed. In connection with this was a forge for iron and tin work, etc. The barrack for the housing of the 300 men in the employ of this department was well constructed and kept clean and orderly.

During the inspection the following needs of the Red Cross on this front was presented to us: Rubber gloves, novocain, antipyrin, urotropin, asperin, quinin, hydrochloride, chloroform (simple), antifebrin, terpin hydrate, green soap, simple soap, potassium hydrobromide, microscopic stains, microscopic material (such as slides, cover-glasses and microscopes), Ricord needles, apothecaries' scales, accurate grocers' scales (3 to 5 kilos), photographic materials (such as metol, hydrochinon, thermocautery), *x*-ray tubes, cystoscopes complete; electric motor for bone work; drills; salvarsan; neosalvarsan; dental material, with dental equipment for field dental cabinet; phenol preparations (such

as carbolic acid, lysol and creolin); sodium cacodylate; suture material; silver wire; catgut in tubes; silkworm gut; silk, etc.; suture needles, all styles and sizes; American boots; oil paper (wax); rubber tubing; rubber sheeting; leather (sole); dry batteries for small hand search-lights; blankets.

4. *Machine Shop for the Repair of Automobile Transports, Ambulances, etc., for the Middle Section of the West Front, Located in Minsk.* This shop made 40 to 50 light repairs, 20 partial overhaulings and from three or four general overhaulings in one month. These repairs are not sufficient for the number of cars in use at the front and the shop equipment, and floor space available is inadequate for larger repair work. The shop contains only four small engine lathes, one shaper and two drill presses. The main repair room is only large enough for a few cars at a time, with no overhead cranes for handling the heavy parts. The automobiles awaiting repairs were largely stored in the open. General Amaporine is also in charge of this repair shop and gave us his opinion concerning the best cars in the service. He says the Jeffrey (English) is a very poor car for the bad roads and that the Ford stands up better than any other. There were many different makes of cars in use, which complicates greatly the problem of making quick repairs. In many cases gears and other small parts have to be machined out in shop. However, it might be possible to increase the output by simply enlarging the floor space and securing workmen who would work longer hours.

WEDNESDAY, AUGUST 16 to 29, 1917. During the night the car had been transferred to Moledeschno, the headquarters of the staff of the 10th Army.

Call was made on the Surgeon-General of the 10th Army and later on the general commanding this army. Permission was here obtained for the inspection of hospitals and sanitation, and transportation of wounded in the military zone occupied by this army.

1. A visit was made to the headquarters of the Russian Red Cross for the distribution of supplies, transportation of wounded, etc., for the 10th Army located in Moledeschno.

Inasmuch as this administrative portion of the Red Cross is so close to the general headquarters at Minsk the amount of stores kept here at the present time is relatively small. The general stock of foodstuffs, medical supplies, cooking utensils, etc., for present needs are kept available for immediate use. A large amount of supply material was found packed and ready for emergency transfer if any occasion demanded it. These headquarters are also used for the administration of a transportation service for wounded in the 10th Army. Living quarters for the administrative personnel are here provided.

2. *The Red Cross Evacuation Hospital St. George.* This is located a short distance outside of Moledeschno, along the railway, and while intended as an evacuation hospital, is at the present time used as a field hospital for internal diseases and for wounded. The present hospital has a capacity of 200 beds with a well-equipped *x*-ray department, operating room, dressing rooms and isolation wards for infectious cases. The staff of the hospital consists of two doctors, two students and twelve nurses. This hospital was found particularly clean, and there was every evidence that the patient secured exceptionally good care and medical treatment. The kitchen was inspected and the food tasted by us, and was found to be abundant in quantity and of good quality.

The main building was built of brick, designed for hospital purposes, and well adapted for the uses to which it was put.

A large number of overflow barracks were provided for emergency use at a time of military activity, when large numbers of wounded would have to be temporarily taken care of here for a day or two before they were distributed to the base hospitals in the rear.

3. *Evacuation Hospital, "City of the Sick and Wounded."* This is situated along the main railway lines passing through the front in the direction of Warsaw, about three versts outside of Moledeschno. The railway line on which this hospital is located is available for the transportation of wounded to within four or five versts (three miles) of the front line positions. The wounded are brought from the front on sanitary trains and are kept in this hospital from two to six days for diagnosis, temporary dressings,

assorting and distribution to base hospitals in the rear. The hospital train with wounded was being unloaded at the time of our visit. The sanitary cars were ordinary freight cars, upon the floors of which the wounded were placed on stretcher beds.

This hospital has a capacity of 6000 beds. There are 200 hospital barracks. The barracks are of wood construction, built in the form of a tent, *i. e.*, the sides of the barrack extending from the ground direct to the center of the gable. The floors of these barracks are placed directly on the soil. Windows are placed in the slanting sides of the barrack and also at the end. The capacity of each barrack is about 50. A church barrack, a theater barrack, a dining-room barrack, a barrack for personnel, a barrack for the staff, a laboratory barrack, a kitchen barrack, a bakery, a barrack for the fumigation of clothes and isolation barracks for infectious diseases are features of this tremendous hospital. During the July fighting 25,000 wounded men passed through this hospital and the hospital at Moledeschno within a period of three days.

This hospital was exceptionally well organized and the patients appeared to be well cared for.

On the opposite side of the railway, and practically a part of this same hospital, with the same general equipment and administration, a division of 500 beds was assigned to the Zemstvo Union. What has been said above in reference to the main hospital equally applies to this division.

4. *Zemstov Union Portable Flying Column.* This flying column for the transportation of wounded is equipped with both motor ambulances and horse ambulances, all of which were housed in tents and ready for immediate transportation.

5. At the village of , eight versts from the front positions, the following hospitals were found and carefully inspected:

(*a*) A division field hospital of the Sanitary Service of the Army.

(*b*) A hospital under the Russian Red Cross.

(*c*) A hospital under the Zemstvo Union.

(*d*) Headquarters of a disinfection unit of the Russian Red Cross.

(*a*) This division hospital was housed in a large barn which had been floored over and divided into four large wards, with a capacity of 210 beds. The staff consisted of seven doctors, eight nurses and twelve feldschers. This field hospital has the capacity to handle 2500 patients per day during periods of active service. The patients lie on stretchers with short folding feet, which permits the stretcher to be raised some four or five inches from the level of the floor. One room is partitioned off and whitewashed for uses in operating work. The ambulance service attached to this hospital is housed in some buildings adjacent to the barn.

(*b*) This is a portable tent hospital, previously a field hospital, under the Sanitary Service of the Army, and now assigned to the Red Cross flying column at rest for the care of wounded and sick soldiers. This portion of the hospital has a capacity of 200 beds and is in charge of two doctors and six nurses.

(*c*) Immediately adjacent to the above, and previously a portion of the same field hospital, 200 beds have been assigned to a Zemstvo Union flying column with a staff of three doctors, eight nurses and four feldschers. In both hospitals the patients were well cared for, with, however, relatively little ventilation in the tents provided for the patients.

(*d*) This portable unit for the disinfection of clothing, delousing, etc., was found at rest here at its headquarters in a small farmhouse about two versts from the village. This farmhouse was divided into three rooms, one of which housed the personnel of the unit, about ten men; in another room were housed the officers, the third intervening room being used for a kitchen. Portable disinfection apparatus was found in the yard and consisted of two disinfectors of the Red Cross type already described.

6. *Epidemic Red Cross Hospital* No. 27. This was found located in the tenant houses adjacent to a large estate-dwelling at . One hundred beds were available for the care of typhoid, dysentery, scarlet fever, scabies, malaria, all of which were found here at the time of the inspection. Both facilities for the care of both officers and enlisted men are provided. The staff of the hospital consists of two doctors, eight nurses and twenty-

seven orderlies. This system of using the small tenant houses surrounding a large landholder's mansion provides facilities for the isolation and treatment of the various types of infections in separate buildings. In the large mansion facilities were provided by the proprietor for the housing and feeding of the staff. The inspection showed the patients were well cared for and received good medical attention.

In the zone of the 10th Army the Red Cross has one other such hospital for epidemic diseases.

THURSDAY, AUGUST 17 to 30, 1917. During the night the car had been transferred to Prude.

1. The large evacuation hospital located here on the railway, with a capacity of 2000 beds, is divided up equally between the Sanitary Service of the Army, the Zemstvo Union and the Russian Red Cross. A careful inspection of this hospital was made. While this hospital, like the "City for the Sick" in Moledeschno, is only intended as an evacuation and distributing hospital for the wounded, nevertheless isolation barracks are provided for the incidental occurrence of infectious diseases. Barracks for venereal diseases, skin diseases (such as scabies), dysentery, etc., are here found. In each division a portable barrack for operations is provided. This barrack is divided into two sections: one for clean operations and the other for dressing. While the equipment for the sterilization of dressings, instruments, etc., is simple, it is quite adequate for the needs of this type of service.

2. *The Hospital of the Society for Nurses.* The Society of Nurses is one of the oldest organizations in Russia doing relief work. This hospital is beautifully located in a country home donated for the purpose by . It has a capacity of eighty-two beds. There are three doctors and eleven nurses. In addition to the main building, which is used for the care of patients suffering from internal diseases, a separate barracks building is used for dysentery cases. On the lawn a tent has been erected for ambulatory cases from the villages (civil population) and convalescent soldiers. A large number of patients are in this way treated without the incidental expense of housing and nursing care. This is the best portion of this institution.

3. *Red Cross Flying Column at for Transportation of the Wounded.* This consists of twenty-two horse-drawn ambulances and five motors. The staff consists of two doctors, two students, two nurses and a personnel of one hundred and fifty enlisted men. The staff is housed in a comfortable dwelling house. The enlisted personnel are at the present time housed in a church-yard, where they have erected crude tents. A portable cooking apparatus in the church-yard provides the food. Horse-drawn ambulances were also found in this church-yard. This flying column operates from behind the front to the field hospitals in the early portion of an engagement and later from the field hospitals to the evacuation points along the railway. The two nurses are kept at the headquarters of the Atriat and are occupied in the distribution of dressings and supplies. They take no part in actual nursing.

4. A call was made at the headquarters of the 1st Siberian Corps. After this we proceeded to Division Headquarters and from there to the front line positions.

Inspection was made of the sanitary condition methods for the administration of first aid. First aid station does not differ materially from those on the west front in France. Within one hundred yards of the first aid station two horse-drawn ambulances were found ready for the transfer of wounded to a field hospital.

5. *A Tent Hospital Organized by a Flying Column of Zemstvo Union at* . The primary duty of this flying column is the transportation of the wounded. During a period of inactivity they organized a temporary hospital in tents for the care of soldiers suffering from internal diseases and also of surgical conditions. The staff of this hospital consists of but one doctor, six nurses and two feldschers. The equipment consisted of a tent for the personnel, a tent for the nurses, two large tents for the wounded and one tent for operations and dressings. The capacity of this hospital is one hundred and fifty. This hospital was not only beautifully located on a sloping hill, which offered excellent drainage, but gave evidence of exceptionally good administration in every way. The tents were well aired and clean, the floors

freshly sanded, the beds clean and the patients well cared for and cheerful. Such excellent work in temporary quarters is to be highly commended.

6. *Division Hospital Sanitary Service of the Army at* . This is a tent hospital with at the present time one large tent for patients, holding about fifty beds, *i. e.*, stretcher type. There is a portable operating room at the present time not erected. In its place is a small temporary cabin for dressing. This hospital has a capacity of handling from 3000 to 4000 wounded men a day in times of action. There are four doctors and ten feldschers on the staff of this division hospital. This hospital has its own ambulance transport service of about thirty-two horse-drawn ambulances. There is an enlisted personnel of 343 men. This ambulance service operates between the front and the division hospital. During the evacuation of the hospital after a conflict it may operate between the division hospital and the evacuation point on the railway. This hospital was poorly located in a region with poor drainage. The reason given for this location was necessity for being close to a village to house the personnel.

7. *The Flying Column for the Transport of Wounded of the 3d Caucasian Corps Located at* . This flying column consists of five motor ambulances of the English type, with forty horse-drawn ambulances. This is the 40th flying column of the Russian Red Cross.

Friday, August 18 to 31, 1917. During the night the car was returned to Minsk.

An inspection was made of Hospital No. 32 of Evacuation of the Sanitary Service of the Army. This hospital was located in the railway yards at Minsk, on an elevated ridge of ground used originally for an elevated railway system. This offered a very excellent place for an evacuation hospital, as it gave exceptional drainage and was between two lines of railway. This hospital is a very large hospital of five barracks and eleven large tents. It has a capacity of 1200 patients at one time. These patients remain from one to three days. They are then distributed to Moscow and Orell. The barracks are the usual type of barracks, exceptionally

clean, with forced ventilation by an electrical system; the eleven large tents, each with a capacity of one hundred patients, are located in immediate proximity to the barracks. The tents are the usual large drop tents, with poles breaking the walls in the middle in partial extension. There is a lining to these tents made of padded cotton to ensure warmth. This lining drops straight below the extending wall poles in order to give a square effect to the tent room. The intervening space between this drop curtain lining and the wall of the tent is used for storing supplies, dressing rooms, etc. One barrack is devoted to venereal diseases, one barrack for isolation purposes, one barrack for lightly wounded, one barrack for dining-room purposes, one barrack for wounded officers. Electric light is supplied in all the barracks and tents. There is a well-equipped laboratory building attached to the administration building of the hospital where the usual working diagnosis is made, and where, in addition to this, special research work is done. Attached to the service are 800 enlisted men in the Sanitary Corps for the transportation of the wounded, etc. This hospital was particularly well organized and exceptionally well administered.

*Storehouses of the Zemstvo Union, Located in Minsk, for the Distribution of Supplies to the Middle Section of the West Front.* These storehouses are very similar to those already described of the Red Cross. At the time of our visit we were told there were fifty-five carloads of food, forty carloads of clothes, dressings, etc. In barracks were found cooking utensils, beds and mattresses, hospital supplies, drugs, etc. We were told that they were particularly in need of (1) disinfection apparatus, (2) many varieties of medicine, and (3) more particularly material for dressings, *x*-ray material and dental supplies.

Saturday, August 19 to September 1, 1917 On the return trip to Petrograd the committee came by the way of Mogilof and there made a call on His Excellency General Korniloff, Commander of the Russian Army. The committee, after expressing to him our appreciation of the privilege of studying the sanitary service, the transportation of the wounded, the hospitals, etc., at

the front, and the value that this information would be to us, explained to him the purposes and objects of the American Red Cross Mission to Russia. After expressing his appreciation of the visit of the Red Cross Commission to Russia and of the committee to General Headquarters the matter of aid and assistance as far as the army was concerned was then taken up. The question of the transportation of the wounded received most consideration. He expressed the opinion that there would in all probability be comparatively little fighting on the middle and north front during the winter, but that active military operation would in all probability persist through the winter on the Roumanian front and that there would probably be need for ambulance service; that the matter of the transportation of the wounded by motor ambulance for the rest of the front could wait until the following spring, when active military operations might reasonably be expected. He stated that while he was very sympathetic, that this whole subject was a rather technical matter, and he would therefore refer it to a commission, with the chief of staff as chairman of the commission, and that the findings of the commission would either be transmitted to us at Petrograd, or, if it seemed more preferable, some of the mission might again visit General Headquarters and discuss the details of putting the plan of motor transportation of the wounded into eventual active operation.

The subject of aid in relation to sanitation of the military zone, more particularly in reference to the matter of bathing and disinfection of the clothing of the troops, was then considered. It seemed advisable to join any effort that might be made in this direction with the ambulance service and to work in coöperation with the work already being done by the Sanitary Service of the Army, the Russian Red Cross and the Zemstvo Union.

In conclusion, General Korniloff expressed his appreciation of the suggestion that aid might be extended to the civilian population in any direction which seemed most advisable to either him or to the Russian people.

A call was then made upon the chief of staff of General Korniloff. Inasmuch as the technical side of this question was to be considered

by him, the technical details of the possible scheme of operation of an ambulance service in conjunction with the Russian Army system, as outlined by Colonel Kolpeschnicoff and Major Grow, was considered in detail.

The objects of this commission to the front were to consider:

(*a*) The Russian system of the care of the wounded from the first aid stations to the base hospitals.

(*b*) The transportation of the wounded.

(*c*) The housing of troops in the line and in rest positions.

(*d*) The sanitation of the military zone, with more particular reference to transmissible diseases and insect carrier.

(*e*) The adaptability of a field ambulance service to Russian conditions.

(*f*) An incidental study of the problem of the refugee population.

(*g*) The business organization of the Russian Red Cross and the Zemstvo Union in relation to relief work.

Transportation of the Wounded. This matter was considered first for the simple reason that it appears to be the most urgent need of all the problems in the war zone in which the American Red Cross might be of assistance. In reference to the field transportation it becomes perfectly evident on inspection that much pain and suffering might be saved and the mortality decreased by a well-developed motor ambulance service to replace the present system. To one conversant with the transportation of the wounded on the west front the very large proportion of crude horse-drawn ambulances, approximately 90 per cent. to motor ambulances is very striking. These horse-drawn ambulances are crude, two-wheeled carts, fitted with springs and capable of transporting two wounded men on stretchers, placed in the floor of the car. The roads are very bad and very rough and add materially to the difficulty and slowness of this method of transportation. There appears to be no reason why, during the period of actual military operations, motor ambulances, properly selected, properly driven, together with some little attention to the roads, could not entirely supplant the horse-drawn vehicle.

Admitting the feasibility of the field ambulance service under

American auspices, the advisability of it will depend on several other factors and considerations.

In the present disorganized state of the Russian Army it would be inadvisable to turn over a large number of light or medium weight cars under Russian personnel. Lack of discipline and control would only lead to such abuse of the cars on the rough roads as to make them useless in a short time. In addition to this the material itself would not be safe on account of the lack of stability of the line.

This brings up the question of the advisability of an American personnel to handle the cars. All of the officers of the army and those in the Red Cross consulted were strongly in favor of an American personnel not only to handle the cars but more particularly to institute repair shops under American mechanics to keep the cars in good condition. That such a personnel would be welcomed by the army there appears to be little question. Inasmuch as such personnel has nothing more to do with the wounded than to transport them from place to place, the objection on the part of the enlisted men and the wounded to English and American nurses, because they do not understand the Russian language, would not here obtain.

The very important consideration as to whether it would be advisable to institute such a field service and American personnel while the Russian army was more or less disorganized would depend largely on the personnel and whether it would submit to rigid control and discipline. The attitude of the Russian officers, as indeed it is our own attitude, is that a properly conducted field ambulance service at the present time would have a very beneficial influence not only along the lines of encouragement to the Russian army, but would set an example of hard work, submission to discipline and counteract some of the misconceptions of liberty which these soldiers have at the present time. It could readily be seen that unless such an ambulance field service is under proper management, and submits to well-directed authority, it would have quite the contrary effect.

Admitting the beneficial effects under such control, concerning

which there appears to be little question, the matter of the housing and feeding of the personnel must needs be considered. Either the American college student or the average enlisted soldier would not willingly live on the Russian Army ration or be satisfied with the method of preparation of it as we saw it under actual conditions. The midday meal consisted usually of a vegetable and meat soup and buckwheat. A similar diet administered to the prisoners of war in German prison camps, when well prepared out of relatively good material, was refused by the English and the Canadian troops. For this reason a separate commissary department for the American field ambulance service would have to be considered. The Americans would therefore have to decide the question of the maintenance of its own personnel, or if by agreement the Russian Government would be willing to supply the material, at least of the preparation of the food.

What has been said of the food is equally true of the housing. While in the summer months the personnel might live in tents, during the winter months the present system of housing the reserves in earth covered cabins, in my opinion, even if the troops were contented, would not be conducive to the best health of the men. I have no doubt, however, that village houses could be assigned for housing the personnel, and with some slight expense in flooring, cots, etc., could be made comfortable.

The question of the maintenance of the cars and the supply of gasoline, tires, etc., would be a matter of consideration as to whether this expense was to be taken over by the American Red Cross, the American Army or whether these materials would be supplied by the Russian Army.

In other words, America must decide in the event of the institution of a field ambulance service for the Russian Army whether it will simply supply the cars and personnel, leaving the working expenses to the Russian Army, or whether it is willing to assume running expenses of completely maintaining such a service.

The working out of the details with reference to the above considerations, with the cost of maintenance, running expenses, etc., has been referred to Major Grow, and will be found appended to this report.

(*d*) A careful study of the sanitation of the military zone was referred to Major Whipple. It is only necessary here to call attention to the value of the institution of the above considered field-ambulance service in carrying out the ideas of bathing and disinfection of clothing, etc., as outlined by Major Whipple and Captain Pirnie. Inasmuch as this function of the ambulance field service and the prevention of disease, and which would keep it occupied for a long period of time when there might be no active military activity, attention is again called to the necessity of strict discipline and control and the willingness of the men to not only drive cars and handle the wounded, but to do whatever other work may be assigned to them in connection with the sanitation in the areas to which they are assigned.

Under present conditions the general health of such a personnel would have to be considered. This could easily be guarded under strict discipline. I have more particularly in mind at the present time the incidence of venereal disease.

(*c*) The Housing of Troops in the Line and in Rest Positions. This matter was taken up in reference to the adaptability of an American field ambulance service to Russian conditions, and more particularly in reference to the influence of such housing conditions on the general health of the troops and in relation to the development of tuberculosis and other pulmonary conditions in the army, with a possible source of explanation of the distinctly higher percentage of tuberculosis in the Reserve army as compared with that occupying a military zone. In the zone of active military operations the troops are housed in village small peasant houses, in rudely constructed tents and in earthen covered semi-dugouts. The village houses are small, sometimes with earthen floors, sometimes floored over. Usually thatched roofs and with relatively little window space.

The earthen semi-dugouts are usually constructed on the side of a hill, but may be constructed on perfectly flat ground. The main portion of the structure is beneath the level of the earth. This extends to a depth usually of about four feet. Over this excavation a slanting roof is placed in the form of a gable at

an angle of about 60 degrees. This roof is made by laying close together logs of about three or four inches in diameter, upon which is placed either earth or grassed sods, arranged very much the way that thatch would be placed. In the center of this roof a chimney-like arrangement is built in about three feet in diameter and glassed over in order to give light. A doorway leads into the structure from the free end. Two long platforms are built on either side. On this the soldier lays his palisse or straw. He is not furnished with any other bedclothes and is expected to use his ordinary uniform and overcoat for necessary covering. A brick stove is built in one end, which gives an ample supply of heat. This structure can be made practically air-tight, and with usual disinclination of the Russian soldier for fresh air, I have little doubt that for the most part it is kept as air-tight as possible. The almost complete lack of sunlight, the lack of facility for disinfection and cleansing, leaves in such structure much to be desired from a hygienic standpoint. These structures are fairly uniform in size.

A whole regiment at rest will be housed in a village of such structures. Quarters for the officers may be placed in one of these structures, and only differs in better internal arrangements, such as flooring, partitioning into separate rooms, cots, tables, etc. Opportunities are here afforded for the rapid development and spread of almost any type of infection.

(*g*) Organization of the Sanitary Service of the Army, the Russian Red Cross and the Zemstvo Union. The diagrams and maps appended to this report give a fairly complete idea of the organization and correlation of these three different agencies. For these maps we are indebted to General Melvah. The organization of the Red Cross and the Zemstvo Union in its central and peripheral storehouse methods of distribution, etc., are very similar if not identical. Our study of the Russian Red Cross distributing organization in the army zone was more carefully done than that of the Zemstvo Union, largely on account of the facilities afforded and the time at our disposal. Our time was so divided that we investigated the Red Cross in going into the

war zone and the Zemstvo Union on coming out. On account of the time consumed on our inward trip in official calls and receiving permissions, more time was afforded for Red Cross investigation, and our time at the Zemstvo investigation was somewhat curtailed. It was evident, however, that the general plan of the two organizations were almost identical. This was also true of the administration of relief in the flying columns, in the temporary and field hospitals, in the evacuation hospitals, etc.

I have not had the opportunity to study the Zemstvo service from its central plant in Moscow to the front as I have the Red Cross organization.

In reference to the Russian Red Cross administration of supplies for relief for the army, one cannot help but be deeply impressed not only by the magnitude of its work, but the very excellent organization and efficient administration from the central storehouses in Petrograd to the headquarters for the front, for the army and for the military zone even up to the front line positions. In the direction of the 10th Army we have been particularly impressed by the ability of the officers of this organization and the efficiency with which they administered the relief supplies entrusted to their care. In the actual work of relief of the wounded and the transportation of the wounded in the hospitals, all three organizations, the Sanitary Service of the Army, the Russian Red Cross and the Zemstvo Union are well equipped to do efficient work, and we found them working side by side in evacuation hospitals and elsewhere with a stimulating emulation and without evidence of friction.

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## DISCUSSION

Dr. Jay Frank Schamberg: I should like to inquire of Dr. McCarthy whether he received, during his stay in Russia, any information concerning the morbidity and mortality of smallpox in the Russian Army or in the civil population? We know that before the war, between 1901 and 1908, a portion of Russia covering sixty to seventy millions of people exhibited an average annual mortality from smallpox of over 37,000. Applied to the

entire population of Russia, this would mean over 66,000 smallpox deaths a year. It would be rather remarkable if there had not been a large smallpox mortality in Russia during the period of the war.

Dr. G. E. de Schweinitz: It may be of interest to state in connection with Dr. McCarthy's characteristically excellent paper that during a recent visit in France, data presented by English physicians appeared to indicate that the greatest wastage in the English army, exclusive of war wounds, was due first to scabies and next to p. u. o., which is the British abbreviation for pyrexia of uncertain origin, and which probably includes trench fever. By wastage, of course, is meant loss of time—that is, temporary exclusion of the man from the fighting forces. In conversation with one of the greatest tuberculosis experts in France it became evident that while tuberculosis has been of very serious import in the French army, it is also true that the original statistics were not correct, and the disease is not nearly so rife as is the impression in this country. These inaccuracies occurred partly because the original statistics were obtained through civil authorities and partly because of inaccuracies in diagnoses. It is interesting also to observe that the hospital formations of the Italian army rank very high and are practically the equal if not the superior of all other hospitals at present in commission in France and Italy. Not only are they well built, even at times artistic, with stucco walls, but the very best men in Italy have been sent into the service. Nurses, however, were scarce. If the Italian soldiers fight their enemies as successfully as their doctors fight the army diseases and injuries the war story of Italy might take on a different aspect.

Dr. McCarthy (closing): As I remember the analysis of the cases in the hospitals for contagious diseases for the entire year, smallpox was not a very important matter. I remember the surprising fact that the one disease predominating during winter and spring months was that of scurvy.

# SOME PROBLEMS OF NUTRITION IN THE ARMY[1]

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Food has been defined as a well-tasting mixture of materials, which, when taken into the stomach, is capable of maintaining the body in any desired state. The choice of these mixtures in the form of menus, their preparation for the plate, their digestion and fate in the body, is the science of nutrition. If we had a complete knowledge of every food substance and the transformation it undergoes in the body; how it is prepared for usefulness, just what purpose it fulfils, how it fulfils this purpose and what becomes of it afterward —if we knew all this for every foodstuff; every class of substance we can use as food—we should have a *completed* science of nutrition.

A person is satisfactorily nourished when he is maintained in a physical and mental status—and we all know that food plays a part in maintaining mental as well as physical status—best fitted for the task he has to perform. We can begin now in view of the military situation in Europe to grasp the size of the task our army is destined to perform. What is the most desirable status, physical and mental, for our army? Very few of our soldiers have been in a fight, and none practically speaking, have lived the trench life—the life of the modern soldier. We have now under arms well on to a million and a half men who, six months ago, were leading peaceful pursuits—the majority of them, perhaps, sedentary, or at least, unmuscular pursuits. In spite of the great part played by athletics in our national life, relatively few of our soldiers were athletes.

[1] Read April 3, 1918

The first requisite therefore was to create a body of well-muscled men. If you could see the great bodies of these men as I have seen them, you would agree that this aim is being rapidly achieved. The average soldier has gained both in weight and in height. (A part of the latter is mere straightening up, but not all.) Flabby muscle has given way to sinewy muscle. Fat has been reduced in many, and its place taken by active tissue. Such a change requires good food and in the muscle-up period a plentiful amount of muscle-forming materials, the best of which in the world is beef.

To gain a fighting spirit also requires good food—and plenty of it—to make the soldier contented, to make him feel well fed and "full of fight." This objective, also, I am sure, is being attained. Does anyone grudge the soldier an abundance of food, even a little superabundance to be on the safe side, if these objects are being attained? I shall speak later of the element of waste which I know has been in your minds.

Army regulations define the ration as the allowance for subsistence of one man for one day. You will be interested in certain facts regarding the history of the ration as thus defined. The first legislation fixing the components of the army ration is dated November 4, 1775. The Continental Congress fixed at that time 1 pound of beef and 1 pound of bread as the allowance for each man per day, "3 pints of beans or peas at a price not to exceed $1 per bushel, 1 pint of milk, ½ pound of rice or 1 pound of Indian meal per week, 1 quart of Spruce beer or cider for each man or 9 gallons of molasses for each company of men per week." The ration also included candles and soap. The ration fixed July 16, 1798, is in some respects the same as we have today. At that time the allowance of beef was raised to 1¼ pounds, or 20 ounces, the allowance of bread or flour to 18 ounces, rum, brandy or whisky 1 gill, and the other items the same as in previous rations. In 1799 the issue of rum was placed at the discretion of the commander. In 1802 a provision was made for the conversion of strong liquors into wine and beer, otherwise the ration was the same as above. This ration continued through the War of 1812.

From time to time there was much controversy over the liquor

component. In 1818 the following recommendation was made: "In a southern climate give molasses in lieu of whisky or beer and only ½ pint of peas, beans or rice." Calhoun, who was Secretary of War at this time, recommended that the liquor components of the ration be discontinued. This was concurred in by General Lovell, who was Surgeon-General of the Army at that time. Congress, however, failed to act, and the liquor continued as a component of the ration until 1838.

During the War of 1812 there was much agitation on account of the failure of the contractor system. This system had prevailed previously, although much trouble had been experienced with it. In 1814 it broke down completely and the House of Representatives asked Monroe, then Secretary of War, for suggestions concerning a revision of the method of provisioning the army. A new system was worked out, but peace having been signed with England, Congress adjourned and left the bill on the calender. In 1817 the Seminole Indian outbreak in Georgia gave still another opportunity to show the weakness of the contractor system. Andrew Jackson, who was Commander of the Army, became so impatient with this system that he finally organized a commissary department for his own army entirely without authority from Congress, and demonstrated that the army itself could handle the matter of supplies much better than outside contractors. This resulted in legislation dated April 11, 1818, which laid the foundations of our modern Subsistence Department. It should be explained here that the Subsistence or Commissary Department, which was separate and independent up to 1912, is now a part of the Quartermaster Corps.

The agitation for discontinuance of the liquor component in the ration came up at almost every session of Congress between 1812 and 1838. In 1832 coffee was for the first time made a part of the ration, and it was provided that six pounds of coffee and twelve pounds of sugar per 100 rations, that is, for one company of men, could be used in lieu of whisky or rum at the rate of one gill a man each day. Nothing further was done with the army ration until 1856 when some agitation was started to increase the coffee and sugar components; after four years this modification was made,

just before the outbreak of the Civil War. The ration which prevailed throughout the Civil War fixed by legislation dated August 30, 1861 was as follows:

Beef, 20 ounces.
Bread or flour, 22 ounces.
Potatoes, 16 ounces three times a week.
Beans, rice or hominy "in proportion with above."

Then for each company of men or 100 rations:

10 pounds coffee.
15 pounds sugar.
4 quarts vinegar.
4 pounds soap.
12 pounds candles.

The peace-time ration differing from the last named only in the absence of potatoes, beans, rice, hominy, etc., was returned to in 1865. These articles were restored by legislation dated 1892. Other minor changes were made which were continued in new legislation dated January 11, 1911. The "garrison ration," as it is known, as fixed by this last Act is as follows:

20.00 ounces beef, or bacon 12 ounces.
18.00 ounces flour, or corn meal 20 ounces.
20.00 ounces potatoes.
2.40 ounces beans.
1.28 ounces prunes.
1.12 ounces coffee.
3.20 ounces sugar.
.32 gill syrup.
.50 ounces evaporated milk.
.50 ounces butter.
.64 ounces lard.
.16 gill vinegar.
.62 ounces salt.
.04 ounces pepper.
.014 ounces cinnamon.
.08 ounces baking powder.
.014 ounces flavoring extracts.

Besides this Garrison ration, the American Army has three other rations, The *Reserve ration* consists of hardtack or army bread, bacon, sugar, coffee, salt and pepper. This, according to regulations, forms the basis of field rations; but at the present time in France is being considerably modified according to the available supply. The so-called *Travel ration* contains soft or hard bread, canned corned beef or corned beef hash instead of bacon as in the Reserve ration, baked beans, canned tomatoes, jam, coffee, sugar and evaporated milk. There is an allowance also for coffee already prepared when it can be obtained at railroad stations. The regulations provide for an *Emergency ration* which has been well defined as simply "a substitute for nothing." This might also be called a tide-over ration. Many attempts have been made to concentrate into small space so that it can be carried in the pack, the necessary nutrients to maintain a soldier for twenty-four hours. The American Army has tried out half a dozen or more such emergency rations but none of them have proved wholly successful. In conference with medical officers of the Navy and a representative of the Bureau of Home Economics of the Department of Agriculture, the Division of Food and Nutrition of the Surgeon-General's Office has reached the conclusion that no satisfactory emergency ration has yet been proposed and has taken the ground that the most satisfactory form of concentrated ration is hard bread supplemented by potted beef or ham, dried beef or sardines, and when there is opportunity for the use of a portable cooker, three ounces of sliced bacon should be added.

Returning to the subject of the Garrison ration, which forms the basis of feeding in all of our training camps, it should be explained that this ration as fixed by law does not prescribe what the man shall eat. It is merely used as the basis of the money allowance for the ration. A long list of substitutive articles is carried by the Quartermaster Department, and the soldiers are allowed to eat anything they choose from this list, but they must not spend more than the amount of money represented by the cost of the Garrison ration, with certain definite percentages of substitutions, at the time and place where they are stationed. For example, the value of

the ration for this month at Washington Barracks is about 41 cents. This amount of money multiplied by the number of men in the organization is the amount which the mess sergeant may spend for food for each day for his company. As a matter of fact, meat, bread, and potatoes form the backbone of the ration now as always. The allowance of meat, $1\frac{1}{4}$ pounds including bone, for each man per day is purposely placed high, so as to cover all emergency requirements. The actual consumption of meat as our food surveys have recently determined is much lower than this. The average, I should say at this time, is not in excess of $\frac{3}{4}$ pound of meat for each soldier.

The list of substitutes makes provision for a considerable elasticity and variety in the diet. More than this, however, if the men do not like what the Quartermaster has in store, they are at liberty to take money from the Quartermaster in lieu of rations and buy materials outside. This is at the discretion of the commanding general. Where local market facilities are good, there is no objection to this method, provided the food supplied is carefully inspected. With an inexperienced mess sergeant, there is likely to be a waste of funds from this cause, but it sometimes happens that the local market is cheaper than the Quartermaster Department.

Let me now explain the actual workings of the mess system in vogue in our army. The soldiers are fed by companies or equivalents of companies, such as batteries of artillery, troops of cavalry, ambulance companies, field hospital companies, etc. According to the new tables of organization, an infantry company consists of 250 men. In the Civil War, remember, a company was only 100 men. Companies now, therefore, are practically the equivalent of battalions in those days, and a battalion of 1000 men now is nearly the equivalent of the old regiment.

Each company in camps such as those now in existence in this country has an individual mess-hall with its appropriate kitchen equipment. When the cantonments were started, the company consisted of only 152 men, and some of the mess-halls were constructed on this basis, but they have since been enlarged in most

camps, so that now it is possible to seat the entire company of 250 men at one time. The mess conditions are under the supervision of a commissioned officer of the company designated by the captain and known as the mess officer. The purchasing agent of the company is a sergeant, known as the mess sergeant. It is his business to keep the mess accounts with the Quartermaster and to draw his rations for his organization in ten-day periods. This has been found by experience to be the most convenient period of time for a company. Each company kitchen has an adjoining storeroom large enough to contain supplies for a ten-day period. At the beginning of this period the mess sergeant learns from the first sergeant of the company the number of men on the ration list. He multiplies this number by the value of the ration in money for the current month and multiplies this by ten to find the amount of his credit with the Quartermaster for the ensuing period.

In conference with the company cook, the mess sergeant makes out menus for some days in advance and calculates the amount of each article required for the preparation of these menus. Such menus are supposed to be approved by the mess officer or the company commander and by some medical officer. You will be interested, I think, in knowing how these menus run. I quote from one for Company A, 301st Field Signal Battalion, November 5, 1917, at Camp Devens:

Breakfast:
- Oatmeal, milk and sugar.
- Pork sausages.
- Fried potatoes.
- Bread and butter.
- Coffee.

Dinner:
- Roast pork or roast beef.
- Baked potatoes.
- Bread and butter.
- Cornstarch pudding.
- Coffee, milk and sugar.

Supper:
Beef stew.
Corn bread.
Karo.
Prunes.
Tea.

SUNDAY, NOVEMBER 4, 1917.

Breakfast:
Cornmeal mush, sugar and milk.
Hash.
Potatoes.
Bread and butter.
Karo.
Coffee.
Dinner:
Roast pork.
Baked potatoes.
Celery.
Turnips.
Peas.
Cranberry sauce.
Mince pie.
Ice cream.
Cocoa.
Supper:
Cold pork sandwiches.
American cheese.
Crackers.
Cocoa.

On the whole, it must be said that the mess system in vogue in the American Army works well. Its weak points at this time are obviously the inexperience of the mess officer and the mess sergeant, the fact that good cooks are not available, and the absence of an adequate system of inspection. It was the realization of these weak points in our system together with the importance of conservation

of our food resources and the concern of the Surgeon-General for the nutritional interests of the army, that led to the organization of the Division of Food and Nutrition of his office. The object of this division might be expressed briefly in this way: to apply the science of nutrition to the problems of feeding the army. We wish to secure for the army perfect nutrition with the least possible waste of food. The Government is not in the least niggardly with the army; indeed, we must not conserve to the point of denying the soldier anything he should have.

It should not be understood that it is the work of the Food Division of the Surgeon-General's Office to supply food for the army. As already explained, this is done by the Quartermaster. The Quartermaster's Corps conducts practically all of the business of the army, and the quartermaster attached to the camp or to a tactical division is, so to say, the business agent of that unit. He purchases all the food, transports it and places it in storage at some place available for the camp or army. Upon requisition by the different organizations, he issues the food, as already explained, and carries in stock the entire list of articles prescribed in the garrison ration and in the list of substitutes. He may also have what is known as a "Sales Department" which contains a considerably wider range than the list of substitutes. For example, the patent breakfast foods — Post Toasties, Puffed Wheat, Puffed Rice, and other package foods, can be purchased through this Sales Department.

The work of the Food Division is largely of an advisory or inspectorial nature. We have been authorized now by the Secretary of War to do three things: (1) to inspect all the food of a camp with reference especially to its nutritive value; (2) to seek to improve the mess conditions (cooking and serving of the food) to the end that a properly balanced menu will be employed and the food served in palatable form; (3) to determine the actual consumption of the food and the amount of waste and report these facts to the Division Commander. The division contains now 65 officers and some 50 enlisted men. A Nutritional Survey Party, as it is called, consists of four officers and several enlisted men. This

party visits a camp and spends from two to four weeks studying food conditions and making recommendations through the chief surgeon to the commanding officer of the camp. We have nine such parties operating at the present moment. Each party makes a tour of from four to six camps and then goes back over the same ground to observe especially what improvements have been made.

A first contingent of six officers under the leadership of Major Philip A. Shaffer, dean of the Medical Department of Washington University, has gone abroad to report to General Pershing for similar service in France. Their duties will be to aid in proper nutrition and messing of troops and supervising the conservation of food so that it shall be consistent with adequate feeding of soldiers in campaigns.

Already the Food Division has been able to improve food conditions in a considerable number of camps. Our officers have caught at the subsistence stores spoiled meats and spoiled canned goods and have condemned them. They have suggested improvements in mess arrangements, in menus and have given systematic instruction to the mess officers and mess sergeants in food values and the proper uses of foods. In many instances their recommendations, having the full force of recommendations from the Surgeon-General himself, have been adopted without question. In addition, we have already gathered a considerable body of information regarding the actual consumption of food and the amount of waste.

The accompanying table shows one page out of our statistical report of actual feeding conditions in individual mess houses. (Table I.) As shown on this page, in three messes in Camp Travis, Fort Sam Houston, Texas, and base hospital mess and three messes at Camp Wadsworth, Spartanburg, South Carolina, the food consumption is expressed on the man-per-day basis. This is obtained by (1) making an inventory of the amount of food on hand in the company storehouse, at the beginning of a definite period; (2) a list of accessions to stock during the period, and (3) an inventory at the end of the period. The second inventory subtracted from the sum of the first, plus accession to stock, gives

the amount of food used. Concurrently with this, the garbage is separated into several cans, one for spent bone, one for peel, and

TABLE I.—PAGE FROM STATISTICAL REPORT OF FOOD CONSUMPTION IN THE TRAINING CAMPS

| Food per man per day. | | | | Consumed distribution of fuel val., per cent. | Wasted, per cent. | Per man per day. |
|---|---|---|---|---|---|---|
| Nutrients. | Supplied. | Wasted. | Consumed. | | | |
| | | | Camp Travis | | | |
| 0042, | 90th Div., Caisson No. 1, Nov. 7 to Nov. 13, 1917 | | | | | |
| Protein, gm. . . | 117 | 15 | 102 | 14 | 13 | Consumed cost, 37c. |
| Fat, gm. . . . | 101 | 18 | 83 | 25 | 18 | Waste cost, 5c. |
| Carbohydrate, gm. | 519 | 54 | 465 | 61 | 10 | Total waste, .50 lb. |
| Fuel value, cal. . | 3547 | 450 | 3097 | 100 | 13 | Edible waste, .22 lb. |
| 0043, | 90th Div., Co. A, 357 Inf., Nov. 8 to Nov. 14, 1917. | | | | | |
| Protein, gm. . . | 135 | 5 | 130 | 13 | 4 | Consumed cost, 37c. |
| Fat, gm. . . . | 185 | 6 | 179 | 40 | 3 | Waste cost, 1c. |
| Carbohydrate, gm. | 505 | 16 | 489 | 47 | 3 | Total waste, .50 lb. |
| Fuel value, cal. . | 4345 | 142 | 4203 | 100 | 3 | Edible waste, .15 lb. |
| 0044, | 90th Div., Co. B, 357 Inf., Nov. 8 to Nov. 14, 1917 | | | | | |
| Protein, gm. . . | 85 | 3 | 82 | 15 | 4 | Consumed cost, 31c. |
| Fat, gm. . . . | 68 | 3 | 65 | 26 | 4 | Waste cost, 1c. |
| Carbohydrate, gm. | 346 | 10 | 336 | 59 | 3 | Total waste, .37 lb. |
| Fuel value, cal. . | 2399 | 81 | 2318 | 100 | 3 | Edible waste, .13 lb. |
| | | | Fort Sam Houston | | | |
| 0040, | Base Hosp. Det. Mess, Nov. 4 to Nov. 10, 1917 | | | | | |
| Protein, gm. . . | 112 | 4 | 108 | 17 | 4 | Consumed cost, 40c. |
| Fat, gm. . . . | 106 | 6 | 99 | 34 | 6 | Waste cost, 2c. |
| Carbohydrate, gm. | 333 | 12 | 321 | 49 | 4 | Total waste, .36 lb. |
| Fuel value, cal. . | 2801 | 121 | 2680 | 100 | 4 | Edible waste, .19 lb. |
| | | | Camp Wadsworth | | | |
| 0068, | 27th Div., Bat. E, 106 FA, Dec. 5 to Dec. 11, 1917. | | | | | |
| Protein, gm. . . | 170 | 4 | 166 | 16 | 2 | Consumed cost, 49c. |
| Fat, gm. . . . | 187 | 7 | 180 | 38 | 4 | Waste cost, 2c. |
| Carbohydrate, gm. | 507 | 15 | 492 | 46 | 3 | Total waste, .82 lb. |
| Fuel value, cal. . | 4515 | 143 | 4372 | 100 | 3 | Edible waste, .46 lb. |
| 0069, | 27th Div., Co. I, 12 N. Y. Inf., Dec. 6 to Dec. 13, 1917. | | | | | |
| Protein, gm. . . | 151 | 8 | 143 | 14 | 5 | Consumed cost, 42c. |
| Fat, gm. . . . | 126 | 5 | 121 | 26 | 4 | Waste cost, 3c. |
| Carbohydrate, gm. | 674 | 42 | 632 | 60 | 6 | Total waste, .95 lb. |
| Fuel value, cal. . | 4554 | 252 | 4302 | 100 | 6 | Edible waste, .68 lb. |
| 0070, | 27th Div., Co. I, 106 Inf., Dec. 6 to Dec. 12, 1917 | | | | | |
| Protein, gm. . . | 118 | 9 | 109 | 14 | 8 | Consumed cost, 36c. |
| Fat, gm. . . . | 89 | 4 | 85 | 25 | 4 | Waste cost, 3c. |
| Carbohydrate, gm. | 516 | 38 | 478 | 61 | 7 | Total waste, .90 lb. |
| Fuel value, cal. . | 3428 | 230 | 3198 | 100 | 7 | Edible waste, .58 lb. |

other inedible refuse such as coffee grounds, egg shells and the like, and one for table or edible waste. This last fraction is weighed, sampled and analyzed. The total nutrients contained in the edible waste subtracted from the total nutrients contained in the food as supplied, gives the actual consumption of food. This table gives a fair idea of the very high variation of food consumption, ranging as noted from 2300 to 4300 calories per man per day. One reason for this large variation is the availability of extra foods at camp exchanges and adjacent restaurants. The table shows also a high variation in the amount of waste and is fairly typical of the difference we have found between the National Army Camps and the National Guard Camps. This difference is largely due to the fact that in the National Army camps, schools for cooks and bakers have been in operation from the very beginning, and at the time these surveys were made the cooks in the National Army Camps, although having had only a couple of months' experience, were already much more efficient than the cooks in the National Guard camps who had not received instruction in such schools. It should be stated, however, that the National Army camps are much better equipped as regards their kitchens: they have better ranges, better storehouses and more conveniently arranged mess halls than have the National Guard camps.

The general public is naturally very much interested in this matter of waste. Numerous reports from civilians who have visited the camps have reached our office to the effect that there is gross and wanton waste of food. These observations, as a rule, are purely casual, and in many instances at least are incorrect. In the construction period of the camps the construction contractor was responsible for a great deal of the visible waste of food. The ordinary civilian visiting such a camp and seeing evidence of waste did not distinguish between the civilian contractor and the army. Whole heads of cabbage, whole potatoes, spoiled hams, joints of beef, etc., could be seen in the garbage pails, in the garbage wagons or garbage cans, and a hasty conclusion was reached that the army was thus wasting food. Our officers have now visited all of the large military camps, numbering altogether in the neighbor-

hood of forty. They have very rarely seen in any of the camps any such evidence of waste as reported in these private letters, which unfortunately have found their way to the public press. It is a great exception to see whole potatoes or large pieces of bread or bones with meat attached in any considerable amount in any of the garbage cans from the army mess houses. I have personally visited 22 camps and have looked into thousands of garbage cans, and bear witness that in the great majority of these cans one does not see more waste proportionately than can be seen in the garbage of an ordinary household.

We have recently had reports from Camp Funston and Camp Sevier which show that the waste has been reduced to such a point that it is practically negligible. For example, in one mess house in Camp Funston, where more than 200 men were fed, the total edible waste from three meals was only 6 ounces; at Camp Sevier the report of our party working there at the present time is that in a considerable number of mess-houses the total waste from a meal is not over $\frac{1}{2}$ pound. This means satisfactory discipline and, especially, it means inspection of plates at the end of the meal. Conservation has been made a subject of division orders in these camps, and others the instructions being that men shall not take on their plates more than they can eat, violation of this order being made a cause for punishment. Company commanders at their discretion can compel a man to eat at the next meal anything he has left on his plate. It means also satisfactory serving arrangements. It has been the experience of our officers that the most economical way of serving men in large numbers is by what we call the Squad System. If possible, men should be seated by squads and should be served by their own squad leader. The essence of the system is, however, that the squad leader shall have authority over the serving of his men. He either serves the food himself on their plates or at least sees to it that no man takes more food than he can eat, and reports him if he does.

It should be remembered that these company households are still very young. None of them in the National Army are more than six months old. To take a body of 250 men at random from

the civilian population and train them in six months in the handling of this large quantity of food, so that there should be no undue waste, is indeed a fine accomplishment.

Many problems are arising constantly in connection with our work. We were faced at the start with the fact that there is very little exact information on the amount of food required by the army in training or in the field. Such information as exists is obtained largely from the record of purchases in the Quartermaster Corps or the corresponding departments of other armies, and not from the estimation of food consumed directly, We have, I believe, the first instance in the history of warfare, where the actual amount of food consumed is estimated directly in the camp and in the field where the troops are operating. This is made possible by our system of feeding men by companies. In this way it is possible to check up closely also on the relative cost of the different foods. We find, for example, that where more meat is used the cost of the ration is always higher. Meat, so far as we can learn, represents the most expensive article of diet, but meat is also one of the most important articles of food, especially for soldiers in the muscling-up period of their training. Experiments by Thomas and others show that the nitrogenous waste of the body is most readily replaced by the nitrogenous constituents of meat. Meat, then, is the most economical repair material for muscle and other active tissues. Next to meat comes the protein of milk and eggs, and below these the proteins of cereals, legumes, beans, peas, etc. It has been proposed by Prof. Lusk to call these most economical proteins, proteins of Class A, meaning that they are most valuable for the purpose of repair and restoration of tissue, and hence also for the growth of tissue, in the whole list of foodstuffs.

We were faced also at the beginning with the question of what should be the optimum amount of protein in the ration. Authorities now generally agree that muscular work does not involve a breakdown of muscle tissue, rather the contrary. A man who has not been accustomed to work, when he begins actual muscular exercise instead of breaking down muscle will build up muscle and it has been abundantly proved by numerous experiments that the

breakdown of nitrogenous material in the body does not increase in muscular work over the amount broken down in complete muscular rest. This is a surprising fact, but it is now quite incontrovertible. Muscular work is done at the expense of potential energy in the form of carbohydrate and fat. There is much evidence also that this energy can be derived most economically from carbohydrate food, especially from sugar, and this doubtless explains the craving of men in muscular training for sweets. These facts would indicate that a relatively small amount of protein or meat in the diet would be sufficient for muscular work. It is quite possible that our soldiers could get along with considerably less than they are using, although our investigations show that they are actually using much less than the government allowance. There are some facts, however, which deter us at present from recommending a radical reduction in the amount of meat in the ration. First of all is the fact that meat stimulates heat production in the body more than any other foodstuff, and therefore assists in keeping the body warm in severe weather. There is some evidence that for a quick delivery of maximum energy, such as may be necessary in getting "over the top," a high protein diet is necessary. We certainly desire that the American soldier shall have plenty of "punch" to his fight, and if a high protein diet will insure this punch, nobody, I am sure, will grudge him all the meat he feels like eating.

Other armies are getting along on less meat than allowed by the Government to our army. The British Army allows 1 pound per man per day, the French Army $\frac{3}{4}$ pound, the Italian Army only $\frac{1}{2}$ pound. Our allowance, you will remember, is $1\frac{1}{4}$ pounds, but the actual consumption by our army up to the present time in the camps is this country does not exceed $\frac{3}{4}$ pound. It would therefore seem that $\frac{3}{4}$ pound of meat provides a sufficiency of protein of this class.

Table II exhibits a comparison of the British, Canadian, French, Italian and United States rations, both for ordinary encampment training and for field uses. The British field ration is the ration used in the training camps in France. When the men go into the

trenches or engage in active operations, this is supplemented by the addition of pea soup, butter and sugar amounting to 300 to 600 calories. The Canadian diet No. 40 is taken from an actual weekly diet sheet as used in the Canadian training camps in England last September. The French normal ration is the training ration, the reserve ration corresponds very closely to our own reserve ration and their strong ration is their campaign ration. Corresponding rations for the Italian army are the territorial and combating rations. The United States Garrison ration as laid down by the regulations provides, as shown here, 4632 calories per man per day. When, however, this ration is made the basis of money allowance, certain substitutions are made, for example, 30 per cent. of meat is issued as bacon, 20 per cent. of the allowance for potatoes is issued as onions and 10 per cent. as tomatoes. With these substitutes made throughout, the Garrison ration, "modified" as we call it, provides over 5000 calories. Now, the average consumption in the training camps as shown by our surveys is to date just a little less than 4000 calories. On this diet, supplemented of course, by a certain consumption of food from the camp exchanges the men have gained in weight on an average of about 9 pounds since entering the training camps. Some organizations even show an average gain of as much as 20 pounds. Others only 2 or 3 pounds, but the average throughout the army, according to the best information we can obtain today, is in the neighborhood of 9 pounds per man. Compare with this army ration the average consumption of food as shown by recent family dietary studies made by the Bureau of Home Economics under Dr. Langworthy at the Department of Agriculture. (See Table III.)[1] Note that the consumption of food per man per day in farmers' families is quite similar to that as already shown for the average allied soldier in training. The work of the soldier in training, therefore, so far as its intensity is concerned, may be closely compared with the work of a farmer. According to an article published recently in *Nature*, the average consumption of food among the English

[1] Through Doctor Langworthy's courtesy I am permitted to show these figures for the first time.

TABLE II.—COMPARISON OF ALLIES' RATIONS

| Ration. | Weight. | | | | Fuel value. | | | | Distribution. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total, grams. | Protein, grams. | Fat, grams. | Carbohydrates, grams. | Protein, calories. | Fat, calories. | Carbohydrates, calories. | Total, calories. | Protein, per cent. | Fat, per cent. | Carbohydrates, per cent. |
| British Field | 1461 | 143 | 154 | 440 | 586 | 1432 | 1804 | 3822 | 15.3 | 37.5 | 47.2 |
| British Field and Trench | 1893 | 144 | 174 | 463 | 590 | 1618 | 1898 | 4106 | 14.3 | 39.4 | 46.3 |
| Canadian, Oct. 1, 1917 | 1860 | 151 | 182 | 460 | 619 | 1693 | 1886 | 4198 | 14.7 | 40.3 | 45.0 |
| Canadian Diet No. 40 | 622 | 132 | 127 | 363 | 541 | 1181 | 1488 | 3210 | 16.9 | 36.8 | 46.3 |
| French, Normal | 1261 | 141 | 89 | 467 | 578 | 828 | 1915 | 3321 | 17.4 | 24.9 | 57.7 |
| French, Reserve | 1091 | 112 | 114 | 385 | 460 | 1063 | 1580 | 3103 | 14.8 | 34.3 | 50.9 |
| French, Strong | 1362 | 152 | 97 | 509 | 623 | 902 | 2087 | 3612 | 17.2 | 25.0 | 57.8 |
| Italian, Combating | 1366 | 142 | 67 | 519 | 582 | 623 | 2128 | 3333 | 17.5 | 18.7 | 63.8 |
| Italian Territorial | 1116 | 94 | 50 | 415 | 385 | 465 | 1701 | 2551 | 15.1 | 18.2 | 66.7 |
| U. S. Garrison | 1935 | 175 | 125 | 671 | 718 | 1163 | 2751 | 4632 | 15.5 | 25.1 | 59.4 |
| U. S. Garrison Modified | 1803 | 166 | 178 | 657 | 681 | 1655 | 2694 | 5030 | 13.5 | 32.9 | 53.6 |
| 87 messes, average | 1940 | 139 | 130 | 536 | 570 | 1209 | 2198 | 3977 | 14.3 | 30.4 | 55.3 |

TABLE III.—FAMILY DIETARY STUDIES

| | No. of fam. | Average income. | Days per man. | Cost. | Per man per day.** | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Protein, grams. | Fat, grams. | Carbo., grams. | Calories. |
| Garment makers | 7 | $724 | 168 | .38 | 109 | 80 | 494 | 3130 |
| Professional men | 17 | 2208 | 434 | .564 | 99 | 149 | 438 | 3490 |
| Teachers | 32 | 2150 | 620 | .473 | 88 | 126 | 428 | 3200 |
| Farmers | 12 | .. | 384 | .436 | 101 | 130 | 503 | 3585 |
| Engineers (professional) | 5 | 2252 | 97 | .526 | 85 | 124 | 395 | 3035 |
| Laborers | 6 | 1497 | 205 | .35 | 94 | 102 | 481 | 3220 |
| Salesmen | 5 | 2527 | 121 | .449 | 88 | 111 | 405 | 2970 |
| Mechanics | 10 | 1303 | 309 | .44 | 95 | 113 | 444 | 3175 |
| Mother wage earners | 12 | 923 | 326 | .33 | 105 | 66 | 440 | 2955 |
| Retired | 5 | 1647 | 130 | .48 | 81 | 121 | 420 | 3095 |
| Clerks | 11 | 1934 | 225 | .50 | 90 | 119 | 417 | 3040 |
| Weighted, avgs. | 122 | 1799* | 3019 | .438 | 94 | 117 | 438 | 3180 |

* Average, 110 families.

**All members of the family reduced to the basis of men.

munition workers for 1917 where more than 18,000 observations were taken, is 3463 calories. Summarizing again, we may say the average American farmer uses about 3500 calories, the average English munition worker very nearly the same, the average soldier of the Allies, considering British, Canadian, French, Italian and American forces, in training camps about the same amount and in actual campaigns some 500 calories more.

Another problem in which we have been greatly interested, is whether the soldiers should be given all the sweets they crave. Our survey parties in the military camps have determined the actual consumption of food from the exchanges or "canteens," as they used to be called, as well as from the mess house. In one camp where there was but a single exchange, it was possible to determine the average consumption with a high degree of accuracy. In these canteens or regimental exchanges, the foods which are bought by the soldiers are for the most part candies, and light drinks (the food value of which is represented entirely by a syrup), cakes, pies, ice-cream, etc., in other words, articles of food which would be classified as sweets. In this particular camp it was found that the average soldier bought in the neighborhood of 500 calories of energy every day in the form of sweets. This represents fairly typical conditions. Wherever it has been possible to estimate with any degree of accuracy at all the consumption of food from these exchanges, we have found figures ranging in the neighborhood of those just quoted. We may say then, that the average soldier craves in the form of sweets, which represent quick energy in much the same way that alcohol in small quantity represents quick energy for the body, food amounting to about one-eighth of his total daily requirements. The question may fairly be asked whether the government would not be well advised to reduce the quota of meat and replace the amount thus saved with sweets, provided as a part of the ration.

Still another question of great interest, not only for the army but for the entire civilian population, is the question of dehydrated vegetables. As a means of preservation and therefore of conservation of our food supply, dehydration or drying has already

proved its place. By means of improved appliances, this measure may now be extended to classes of foodstuffs not ordinarily preserved by drying. Potatoes, cabbage, spinach, strawberries and many other articles usually preserved by other means may now be dehydrated much more effectively than by ordinary means of drying, and may be preserved in this dehydrated condition for a considerable length of time, if not indefinitely. The importance of this measure for the army lies in the saving of tonnage or cargo space in transportation of food materials across the country and across the water. Major Samuel C. Prescott, of the Food Division, has prepared an exhaustive report on the subject of dehydration covering all phases of the subject from the saving in the space to the chemical composition and microbiology of the product. Immediately after this report was submitted to the Quartermaster Department, that department began placing orders for dehydrated vegetables such as potatoes, onions, and carrots for the use of General Pershing's army. As yet, the tonnage contracted for is not large but in all probability in the very near future dehydrated vegetables will become a staple article in our army rations as they have already become in the ration of the British army. Thousands of tons of dehydrated vegetables are being prepared in Canada, some also in the United States for the British Army. By simply soaking in water and boiling in the same water, these vegetables are brought back to the condition of fresh vegetables so perfectly that very often they cannot be distinguished from the fresh vegetables themselves. Another advantage of such products is the very high saving of time in the company kitchen. Dehydrated vegetables put up in packages are ready for the kettle; this saves the work of one or two men a day.

It is fairly safe to predict that before very long methods will be found for the dehydration of meat as have already been found for the dehydration of milk. Such measures remove many dangers of food poisoning. Meat spoilage is almost entirely due to imperfect refrigeration, but if the water is taken out of the meat it does not need to be refrigerated. Bacteria cannot grow without water. The Division of Food and Nutrition, through investigation made

at Harriman Research Laboratory in New York, has already found a satisfactory method of making meat powder, by dehydration at low temperature and a high vacuum. This can be used as a component of soup stock or dried hash which requires only a short soaking in water and boiling to make a very delicious dish. The Bureau of Chemistry under the direction of Dr. Alsberg is also working on this problem, as is also the Bureau of Animal Industry under Dr. Mohler. There should be, as a result of these studies, in time a very large saving in the cost of living. Imagine the difference in the cost of transportation of milk with and without its water content, quite aside from the saving in the cost of refrigeration. Milk is 88 per cent. water, meat is about 70 per cent. water. Practically all of the water can be extracted from milk, leaving a powder which will go into solution readily, and by combining with sweet butter, can be turned out as a product of any desired composition. Already it is possible to deliver milk of this kind, which at current retail prices costs 14 cents a quart, for less than 9 cents a quart. There should be a corresponding saving in the cost of meat for two of the largest factors in the cost of meat today are refrigeration and freight charges. In the case of milk, the reconstituted article is just as palatable as the original milk and is very much safer for it can be pasteurized twice, once just before powdering, and again just after reconstitution with little extra cost. In the case of meat in the form of soup stock, hash and stew, which form the bulk of meat consumption in the army, the product again is just as palatable as the original meat.

There are many other aspects of the problem of nutrition of the army which would interest you had I the time to take them up in detail. One of the most interesting to us in the office has been the preparation of some special rations for the use of our own American prisoners in Germany and for the use of sick soldiers and prisoners. One of the first things the Food Division was asked to do after its organization early in September was the preparation of an American prisoners' ration. This request came from the American Red Cross, and after a few days we had prepared for them a ration which could be shipped in bulk to the Red Cross Headquarters

at Berne, Switzerland, and packed in parcels not to exceed 11 pounds in weight according to the specifications required by the German Government, and sent three times every two weeks to the American prisoners held in Germany. It was our task to see that such a parcel contained enough food value for the American prisoner to last him until the next parcel should be due to arrive. Articles had to be selected which could be packed in small cartons, and which would be certain to keep for the necessary length of time. These articles also had to be such as could be prepared readily for eating under the limited facilities of the prison camp. The list as finally made up runs somewhat as follows:

Rice, sugar, dried beef, pork, and beans, peanut butter, soda crackers, evaporated milk, milk chocolate, desiccated strawberry, jam, nutmargarine and dried figs.

Provision was also made for variation and substitution such as tea for coffee, marmalade for jam, oleo for nutmargarine, dried apples, apricots, etc., for dried figs, hominy for rice, corned beef for dried beef, etc. I think we may all feel comforted by the thought that if an American soldier is taken prisoner, he will, by this beneficent arrangement of the Red Cross, at least be well fed. Information which seems to be perfectly reliable from the Red Cross Representatives at Berne assures us that the British provisions for their soldiers which are quite similar to ours, are not interfered with, in any way, by the German Government at the present time.

The requirements of the sick soldier are very different from those of the healthy soldier. Considerably more latitude is required in the selection of foods which may tempt the appetite of the soldier, if ill in bed. The realization of these facts led to another request from the Red Cross for a ration to be known as the Invalid Ration. This was designed in the first instance for American prisoners in Germany too ill to be out of bed, but it has been thought that the same ration could be used also by sick soldiers in our own hospitals in this country. This ration therefore has been constructed with the idea that it could be used by sick soldiers anywhere in our own

service, or in the prison camp. The ration has been approved by the President and adopted. It follows:

Unpolished rice, yellow cornmeal, sugar, potted chicken, Julienne or compressed soup tablets, dried milk powder or Horlick's Malted Milk, beef extract, minute tapioca or other form of prepared pudding, crackers, tea, milk chocolate, marmalade, fresh fruit or fruit juice.

These articles, however, are regarded as only supplementary to those of the regular ration whether prisoners' ration or the garrison ration.

It is comforting just now to remember that the status of the science of nutrition in America is fully equal to its status in the land of our enemies at the beginning of the war. If we fail in the trial that is upon us, it will not be for lack of information. If we fail to keep our civilian population properly nourished, it will not be because we do not know the functions of food, or because we do not know what foods are suitable. Likewise with the army.

Our own Government has been foremost in the support of scientific investigations along these lines. The names of Atwater, Chittenden, Lusk, Benedict, Mendel, Osborne, Taylor, McCollum, Alsberg, Armsby are known wherever the science of nutrition is studied, and the completeness of their work is openly admired and envied in England, France, Scandinavia and even in Germany. Immediately preceding the outbreak of the war no less than a dozen young German investigators of promise had studied in American laboratories, because the work of several of these laboratories was considerably in advance of similar laboratories in Germany and Austria. The support of these laboratories by the National Government, by State governments and by our wealthy benefactors—Carnegie, Rockefeller, Mrs. Sage and others—was responsible for their splendid equipment. But the leadership also was not lacking. In fact, the scientific leadership pointed the way to the benefactions and governmental appropriations.

## DISCUSSION

Dr. F. X. Dercum: I should like to ask Major Murlin whether in the dehydration of milk, meat, vegetables, etc., the vitamines are in any way influenced or lost?

Dr. James M. Anders: The communications made here tonight are interesting, instructive and timely. I do not find anything to criticise, but, on the other hand, much to commend in what Major Murlin has so interestingly presented. Undoubtedly we have made great advances along the line of army rations, not only in regard to their component parts but also their methods of use. I am not one of those who believe that food alone will win the war, but I do believe that "health and certain constructive factors" will win this war; and, in the maintenance of an average status of public health the food problem is easily one of the first and most important in war time. The number of producers is greatly reduced while at the same time we are expected to carry on our home activities, and to feed not only our national army and navy and the civilian population, but also must assist materially in feeding our Allies. It seems to me that it is greatly to the credit of the United States that this extra demand, in view of the lessened number of producers, has been fairly successfully met and doubtless will be even more successfully met in the future. We are utilizing more land since the war, and as the result we are increasing our food production. I do not wish by this statement to imply that the farming situation is satisfactory, for we are probably all aware of the high cost and great scarcity of farm labor. In the matter of the distribution of foodstuffs we are defective. There is no question that if the transportation in this country could be brought to a reasonable state of efficiency it would mean a great lowering of prices of foodstuffs and would remove the danger of malnutrition and subnutrition among the poorer classes by bringing larger supplies of foodstuffs within the financial reach of these people. It is to my mind a reflection upon the transportation facilities of this country to read that more than one-half of the apple crop of 1917 was allowed to decay in the orchards. The same might be said of other crops. America is justly regarded as a wasteful nation but she is at the present time rapidly learning some important lessons in food conservation, particularly in connection with farm products. Two most important leaks, the kitchen and the table, have been partially stopped as the natural result of the great increase in the price of foodstuffs. Something was said by Major Murlin of the important work of the Food Commission among our army camps. It seems to me that the only way for large munic-

ipalities to eliminate food waste is to have a food department or food commission with power. There should be no overlapping of the functions between the State and the municipality in this work. A commission or food department by sorting dehydration of certain articles can save a great deal of food now lost to the consumer. The use of substitutes for staple articles of food should be encouraged by all of us. Unfortunately, this has not always worked out advantageously in the past; notably, in New York last year when milk reached a figure which was prohibitive among the poorer classes and other articles were substituted, there occurred an immediate and quite appreciable rise in the death-rate among children. It occurred to me that the 30 per cent. of balanced protein may not have been maintained in their dietary; otherwise, the result might have been different. On the other hand, it is quite possible that the increased death-rate was due to a varied parentage.

Dr. Murlin (closing): The experiments of a number of investigators have shown that the vitamines are not destroyed in the dehydration of milk, meat, vegetables, etc., provided they are dehydrated at a low temperature.

# REMOVAL OF BRAIN TUMOR: REPORT OF A CASE IN WHICH THE PATIENT SURVIVED FOR MORE THAN THIRTY YEARS[1]

By W. W. KEEN, M.D.
AND
ALLER G. ELLIS, M.D.

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## History of the Case

### by dr. keen

I shall give a summary of the case,[2] and at greater length than I would otherwise do, because it was my first modern brain case; because it shows our technic at that time; because it was one of the earliest operations on such tumors, following by only two years Godlee's in 1885, the very first ever done for a tumor of the brain; and because of the great length of time between the operation and the death of the patient.

*History.* T. D., a man, aged twenty-six years, first consulted me in May, 1887, at the request of Dr. M. L. Davis, of Lancaster, Pa., who furnished me with the following history: When three years old the patient fell out of a window, his head striking on some bricks several feet below. The skull on the left side was indented, and (as was disclosed by operation) there was a small fragment of bone detached from the inner table without fracture of the outer table. Evidently the child had struck on the pointed corner of a brick. A scar on the scalp, one-quarter inch long, marks the site of the injury.

[1] Read May 1, 1918.

[2] The full report of the case is given in the Transactions of the American Surgical Association, 1888, and the American Journal of the Medical Sciences, October, 1888.

He lay motionless for quite a long time as if dead. His recovery was slow, but apparently complete. At intervals, ever since he was five years of age, he had had a discharge from the right ear. In 1886 he became partially deaf in the left ear. He had long suffered from frontal headache. In February, 1885, when twenty-four years old and twenty-one years after the fall, violent epileptic attacks set in. They were followed by intense pain in the head. The attacks took place once or twice a week. By the end of April, 1885, the right arm, leg and face, in succession and in the order named, became paralyzed.

Dr. Davis first visited the patient at the hospital in Lancaster, June 8, 1885. As he approached the hospital he heard him screaming with pain, which was located on the left side of the head. The pain was increased by pressure. The right pupil was dilated and not responsive to light. The left was normal and responsive. Vision in the left eye was good, but in the right eye was imperfect. Aphasia was marked so that he could not converse. The pulse was 60 and irregular; the respirations were 16; there was obstinate constipation and coated tongue, but no fever. Syphilis was eventually excluded. The diagnosis was "pressure on anterior lobe of the left hemisphere involving the third convolution and extending backward, due to exostosis, tumor or possibly only thickening of the dura." Later and before operation, the diagnosis was more definitely limited to a tumor. The treatment was potassium iodide with arsenic and laxatives.

The patient's eyesight rapidly failed, and by August, 1885, he had become totally blind, first on the right side and then on the left. In two months his left eye improved sufficiently so that he was able to walk on the street alone. The right eye remained blind for several months, when sight suddenly returned, but vanished in a few hours. This intermittence of vision continued in both eyes. The urine was normal. His mentality was much impaired.

When I first saw the patient, May 30, 1887, in St. Mary's Hospital, Philadelphia, his paralysis had improved so that he could use his arm and walk, though halting very slightly. He was

slow of thought and speech, peevish, fretful and seemed at times dazed. His gait was not spastic. There was moderate deafness, the right pupil was slightly the larger, and the right eye deviated slightly outward and upward. The small scar was three and three-quarter inches above the midzygoma and one and five-eighths inches in front of the interauricular line.

June 7, 1887. He had six epileptic attacks while in the hospital, the first since November, 1885. Other attacks occurred at intervals of a few days. Dr. Oliver saw some of them and made careful ophthalmoscopic records. He was seen in consultation also by Drs. S. Weir Mitchell, Morris J. Lewis and George C. Harlan. The conclusion reached was that though the evidence was probably in favor of tumor, it would be wiser to continue for a time a course of potassium iodide. If he was not better in the autumn and he still desired operation, I told him I would operate.

*Operation.* No improvement having taken place, the patient returned to the hospital for operation in the late autumn. The operation was fixed for December 15, 1887. The hospital had formerly been a dwelling house, and was still quite primitive. Before the operation the carpet was taken up and the walls, ceiling and floor were thoroughly scrubbed with phenol (carbolic acid). New, clean, marine sponges had been kept in phenol, but were used in 1 to 1000 mercuric chloride solution. The instruments were boiled in an open vessel for two hours before the operation; at later dressings they were only soaked in phenol, 1 to 20, for half an hour and then transferred to boiled water suitably cooled. The phenol spray was used all the morning of the operation, but not during the operation itself or at any of the redressings. The hands were disinfected with soap and water, alcohol and mercuric chloride.

For the operation a one and a half-inch trephine was used. This was considered an enormous size, for the largest I had ever used before was only one-half inch in diameter. Removal of the first button exposed the tumor, but it was much larger than the opening. A second button was removed, and this opening at

that time considered large, was still further enlarged by the rongeur until it measured three by two and a half inches. The upper margin was three-quarter inches from the midline. The tumor dipped behind the squamous portion of the temporal bone for half an inch. The dura was adherent to the brain except at the margin of this large opening.

I have quoted this rather fully so as to give an idea of the startling size of this growth and to justify the trepidation which I felt in entering on this *terra incognita*, for this was my very first modern brain operation. My heart "sank down into my boots." But dangerous as the procedure might be I *had* to go ahead. I incised the dura one-quarter inch from the margin of the opening in the bone, and with my little finger, to my surprise and relief, enucleated the tumor with as little difficulty as one scoops an egg out of its shell. The hemorrhage was free but not alarming.

It is worthy of note that during the time occupied by controlling the hemorrhage the large cavity left by the removal of the tumor was half filled up by the resilient brain tissue. The bottom of this deep cavity consisted of softened and in parts shreddy brain tissue. Evidently the roof of the lateral ventricle was intact. The tumor was practically a foreign body starting at the dura as a result of the constant irritation from the little loose fragment of the inner table broken off at the time of the accident and never consolidated with the skull. As the elastic skull recoiled from the blow, evidently the fragment did not resume its original position, but was in contact with the normal inner table and so could not unite with the bone. Every inspiration and especially every impulse from the throbbing heart produced a slight movement of this fragment. The tumor, a fibroma, slowly but constantly growing, pushed the brain tissue downward.

At the conclusion of the operation two rubber drainage tubes were inserted and an abundant gauze dressing applied. The bone could not be replaced as the dura was gone.

The tumor weighed 3 ounces, 49 grains, almost a quarter of a pound. It displaced $2\frac{1}{2}$ ounces of water. Its size was $2\frac{7}{8}$ by $2\frac{1}{2}$

by $1\frac{3}{4}$ inches. Its circumference was $7\frac{1}{4}$ by 6 inches. Its posterior border reached backward nearly to the Rolandic fissure. Pathologically it proved to be a pure fibroma (Figs. 1, 2 and 3).

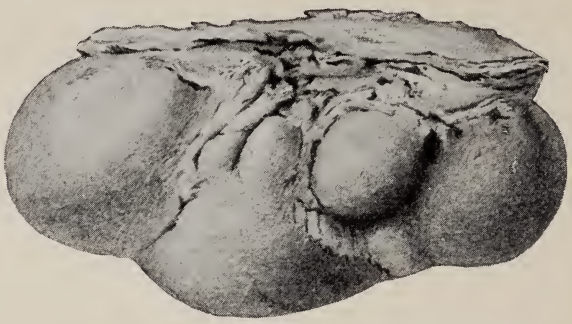

Fig. 1.—Lateral surface of brain tumor, natural size.

Eight days after the operation the floor of the cavity, which was also the roof of the ventricle, evidently gave way, thus opening the ventricle. From the eighth day until the end of the fifth week the cerebrospinal fluid continued to escape very freely.

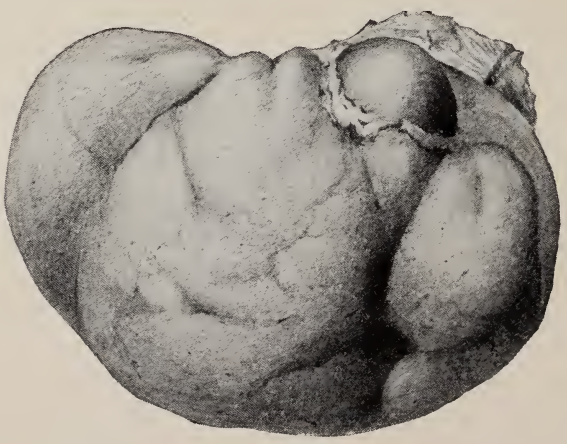

Fig. 2.—Inferior surface of brain tumor, natural size.

*Postoperative Course.* No motor symptoms followed. The temperature was 100± for a week. Considerable disintegrated

clot and shreddy cerebral tissue escaped, estimated at 4 ounces. All but two of the sutures had been removed by the eighth day. On the eighth day the patient's aphasia was greatly worse, the flap bulged more and more, the right arm became paretic, and the dressings—this is to be especially noted—were "saturated with a watery discharge but no pus." On the tenth day the temperature rose 104.2° F., the face and arm were paralyzed, and by the next day the right leg was paralyzed. The patient had also a sharp diarrhea, with fetid stools. Alarmed by these

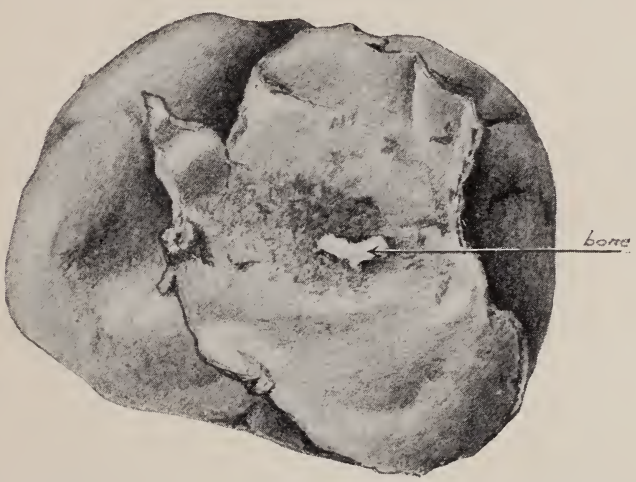


FIG. 3.—Superior surface of brain tumor. This shows the removed portion of the dura and the small fragment of bone which at operation was found detached from the inner table of the skull, natural size.

threatening indications of intracranial pressure, and fearing also infection, I reopened the wound to nearly half of its original size—an error of judgment. But as I had no experience in such operations—and for that matter I might almost say that no one else had—I may be pardoned.

By the fourteenth day a moderate crescentic hernia cerebri had appeared (Fig. 4). The paralysis and aphasia gradually bettered and the temperature became normal. The hernia cerebri at first increased, and by two small pin-holes at its middle a

large amount of clear fluid escaped, evidently the cerebrospinal fluid. This fluid continued to escape until the end of the fifth week. The patient was sitting up out of bed at the end of four weeks. I had stained the nails of both hands with nitric acid and found that the nails on the right hand had grown "decidedly less than the left."

FIG. 4.—Hernia cerebri soon after operation. (From an American Text-book of Surgery, ed. 4, p. 586.)

The hernia cerebri after a short time slowly subsided, until on the seventy-first day it was nearly on a level with the skull. The next dressing was four days later on the seventy-fifth day, when, to our surprise, instead of an elevation, as it had always been, it had changed to a deep hollow. In 1908, twenty-one years after the operation, I noted that the depth of this depression was 5.5 cm. This had been its usual depth (Fig. 5). The patient went home on the eighty-fourth day. The nails of the right hand were still half stained; on the left hand a barely perceptible line of discoloration was visible.

I noted then, what was for years, and up to the last time I saw the patient a few years ago, an always striking phenomenon. When he sat upright any muscular effort—for example, using the dynamometer and forcibly resisted expiratory effort—and a change of posture, as in leaning forward, caused the usually deep hollow noted above immediately to bulge nearly an inch beyond the level of the skull. To protect his brain against injury I bent

a piece of tin to fit the surface of his head, covered it with black silk, and sewed this to the inside of a skull-cap, which he always wore.

Only three cerebral fibromas appear in Bernhardt and Hale White's table of 580 intracranial tumors. I gave an "entirely favorable prognosis" at the time of the operation, and thirty years have fully justified it.

FIG. 5.—Depression in the head, sixteen years after operation. (From an American Text-book of Surgery, ed. 4, p. 586.)

The patient's later history is at first of a stationary condition and then of a slow deterioration. The epilepsy was markedly bettered. In 1902 he wrote me that he had not had an epileptic attack for two years, and from 1902 to 1908 he passed six years more without a convulsion, but his eyesight was gradually failing. He was, however, able to come to my office from Lancaster alone up to about two or three years ago. He died January 29, 1918, thirty years and forty-five days after the operation.

Dr. M. L. Davis at once advised me of his death, and the next morning Dr. Aller G. Ellis went up to Lancaster and procured the brain, which the patient had promised to me many years before.

My hearty thanks are due to Messrs. Harry S. Ziegler and S. Gordon Smyth, both of Base Hospital No. 38 (Jefferson Medical College Unit), for the admirable drawings of the tumor and the ventricle.

## Necropsy Report

BY DR. ELLIS

The body was that of a well-developed adult white man. Rigor mortis was present. There was a slightly oval, cup-shaped depression in the scalp on the left side of the head, just back of the hair line that measured 5 by 6 cm. The center of this was 4 cm. deep in the recumbent position. The scalp was adherent to the margin of this depressed area, and its separation revealed a nearly circular opening in the skull. The longest diameter of this opening, taken from a point at the median line posteriorly to the most lateral point anteriorly was 8 cm.; at right angles to this line the diameter was 7 cm. The depression in the scalp was smaller than this because of a crescentic ledge of very firm periosteum and dura 2 cm. wide that extended inward from the lateral margin of the bone and on a level with it.

Reflection of the scalp revealed it adherent at the margin of the opening in the bone, but fairly easily separated from the underlying tissue over the remainder of the opening. This underlying tissue was a gray, quite thick membrane that in many respects resembled the dura, but which was somewhat thinner than was the dura elsewhere. That this was not dura was clear because the dura was removed with the tumor. It must, therefore, have been a newly formed fibrous membrane. It was not adherent to the brain.

Turning back this membrane exposed a crater-like cavity in the brain having as its deepest part the floor of the left lateral ventricle (Fig. 6). The floor of the ventricle was exposed for a length of 5 cm., the foramen of Monro being plainly visible 2 cm. from the posterior point of exposure. The corpus striatum formed a part of the sloping floor and lateral boundary of the cavity, as the internal portion of the groove was deeper than the ganglion itself. The surface of the corpus had a number of tiny elevations. The thalamus was also visible at the posterior portion of the ventricle.

The wall of the cavity in general was of cerebral tissue that

projected in rounded masses of varied sizes; these were firm and white and looked like recently exposed brain tissue; in short, they presented the appearance of cerebral convolutions that evidently

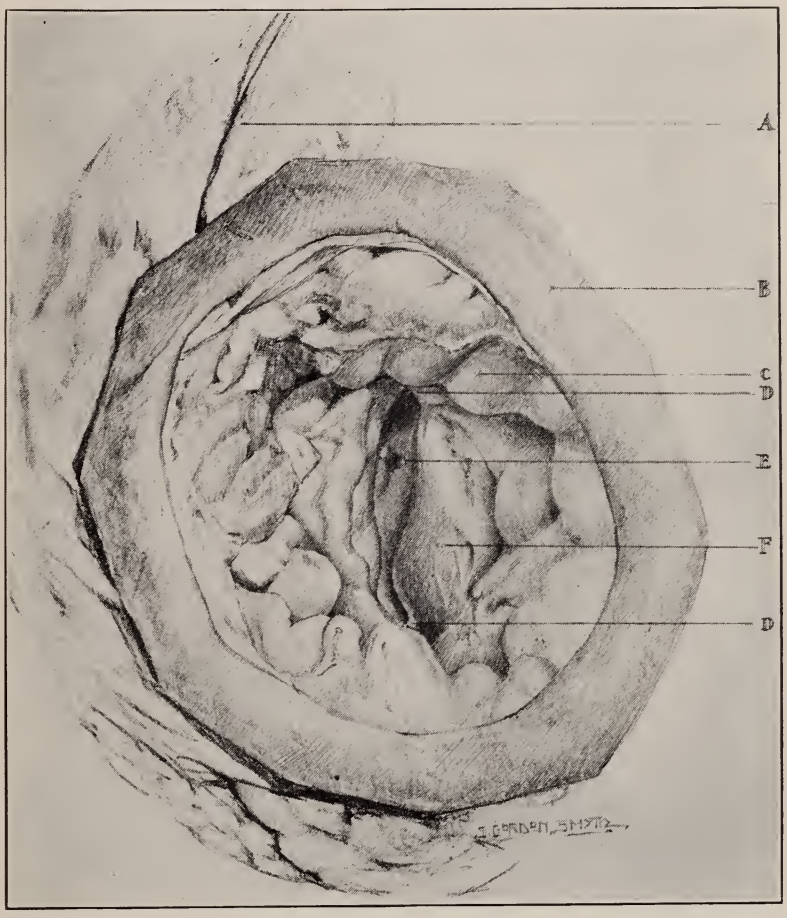


FIG. 6.—*A*, longitudinal fissure of brain; *B*, narrow zone of skull removed to preserve contour of operative opening; *C*, one of the cerebral convolutions forming wall of cavity; *D*, *D*, anterior and posterior boundaries of wide-open left lateral ventricle; these points are 5 cm. apart; *E*, foramen of Monro; *F*, left corpus striatum.

were displaced downward by the very slowly growing tumor. The falx cerebri formed a small part of the inner boundary where the cavity reached the midline superficially.

The base of the brain was unaffected, except that the optic commissure was decidedly smaller in size than is usual. The optic nerves also were small. Microscopically, sections of the left optic nerve showed decided atrophy, dense bands of fibrous tissue extending through it. In areas near the capsule the fibrous tissue occupied much more space than did the nerve tissue itself.

Sections of the corpus striatum showed a covering of ependyma in an essentially normal condition. The tiny elevations on the surface were composed of neuroglia that underlay the ependyma.

Sections of one of the protuberances forming the boundary of the cavity were of cerebral tissue in which there were almost no pyramidal cells immediately under the surface and but few farther inward. Even those that were present were atrophied. There were a few more mononuclear cells along the course of the vessels than are commonly found. The surface next the cavity was of compressed neuroglia with no evidence of the formation of ependyma.

The tissue from which these sections were taken was somewhat distorted because of its position in the wall of the cavity; conclusions, therefore, must be guarded. It would seem, however, that the layer of small pyramidal cells was thinned and the large cells atrophied.

The pathological diagnosis was extensive wound of skull and brain, exposing almost the whole of the left lateral ventricle; atrophy of the optic commissure and nerves, with extensive fibrosis of the latter and atrophy of pyramidal cells of the cortex.

The point of special pathological interest in this case is the extensive exposure of the interior of the left lateral ventricle for a period of over thirty years.

The ventricular area of the central nervous system was greatly increased. So far as the clinical history indicates there was no symptomatology of changed intracranial pressure, either increase or decreased. The fact that the covering of the wound was depressed when the patient was in the erect posture is anatomical evidence that the pressure was increased to no appreciable extent, if at all. When the patient stooped and the scalp protruded the

spinal fluid must have accumulated principally in the left lateral ventricular area. This fluid probably even came from around the spinal cord, but apparently without causing any clinical symptoms.

At necropsy there appeared to be no increased amount of fluid, and the depression of the scalp during life was proof that the wound cavity was not filled by that fluid. The case is unique from the standpoint of duration, and to the best of my knowledge of extent of involvement of the lateral ventricle, and we therefore have none with which it may be compared.

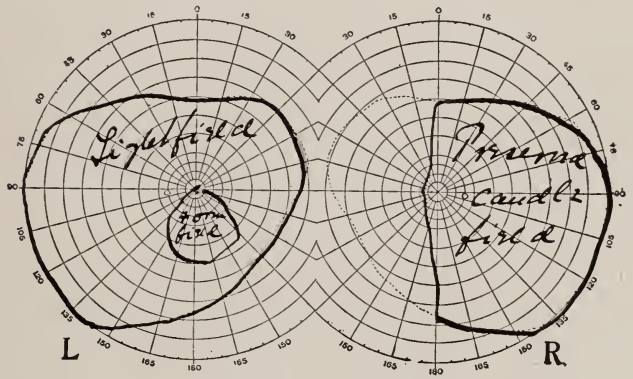


FIG. 7.—Visual fields.

The question arose as to whether the inner surface of the wound became covered by ependyma extending from the ventricle. This proved microscopically not to be the case. According to Weed, however, the ependyma plays a neglible role in the production of cerebrospinal fluid, and this would not be important from that standpoint. If, as is generally believed, the fluid is very largely the product of the choroid plexus, the condition obtaining here would be of more importance from the standpoint of pressure than from production of fluid. The case, therefore, was one of long-standing extensive increase of ventricular area of the brain without demonstrable clinical effect.

## Comment

### BY DR. KEEN

In the length of life after the operation and the wide open ventricle, this case seems probably to be unique. The only roof to the ventricle was the thin fibrous membrane formed after operation. This was not adherent to the surface of the brain. Therefore, the cerebrospinal fluid had free access to the space between the dura and the pia-arachnoid, as well as to the subarachnoid space.

The cause of the formation of the fibroma, its very gradual displacement downward of the cerebral convolutions, with disappearance of the pyramidal cells near the surface and their atrophy deeper down and the great improvement in the epilepsy, have been noted in the history. In spite of his early hemiplegia the patient was able to walk about for years without a cane and with almost no evidence of any paralysis of leg, arm or face, unless possibly the slight deviation of the right eyeball was a result of the tumor. For one or two years before his death he was confined to his bed because of his increasing general weakness.

The hernia cerebri and the cup-like depression at the site of the operation when the patient was erect are shown in Figs. 4 and 5. The changed condition from a cup over two inches deep to a rounded swelling nearly one inch in elevation brought about by muscular compression of the trunk and by the change from the erect to the horizontal position was evidently due partly to the almost instantaneous rush of the cerebrospinal fluid from the other ventricles and from around the spinal cord, and partly to the increase in the blood content of the cerebral veins. This ebb and flow of the cerebrospinal fluid was a most striking phenomenon, the like of which I have never seen in a large experience in cerebral surgery. Even the halting of the breath accompanying the use of the dynamometer, by coughing, etc., would either almost fill up the deep cup by the elevation of its floor, or if continued and with considerable force, would convert the cup into a hill. As in the erect posture the deep cavity was constantly present, it

is evident that the total amount of cerebrospinal fluid was less than the normal, yet no cerebral symptoms ever resulted during more than thirty years of postoperative life.

Fortunately, fifteen years ago (November 30, 1903), midway between the operation and the patient's death, Dr. de Schweinitz examined his eyes and gave me the subjoined brief report:

Ophthalmic Diagnosis: Postpapillitic atrophy of optic nerves.

Vision: Right eye, hand movements, eccentric; left eye, 1/30.

Pupils: Right, 8 mm.; left, 7 mm.; imperfect light reaction.

Muscle balance: Vertical nystagmus.

Eyegrounds: Right eye, nerve head atrophic; both sets of retinal vessels smaller than normal, and perivascular lymph sheaths distended; numerous yellowish white (colloid?) spots in macular regions. Left eye, similar; less marked shrinking of retinal vessels.

Remarks: The appearances are those of postneuritic atrophy of the optic nerves, in the corresponding loss of direct peripheral vision.

The surgery of the lateral ventricles from this time on interested me very deeply.

November 7, 1888, I read a paper[1] in which I proposed a formal operation to tap and drain the lateral ventricles, an operation which is now almost commonplace, but which then had not been reduced to the exact surgical technic which I formulated.

January 11, 1889, on a boy, aged four years, with a tumor of the cerebellum, I first carried this operation into effect on one side.[2] For certain reasons there stated,[3] February 8, I tapped the opposite ventricle. On the thirty-second and thirty-fourth days after the first operation I irrigated the two lateral ventricles from side to side, using 8 ounces of a warm 4 per cent. solution of boric acid. As soon as the warm solution began to flow freely through the brain, the child, who had been a little restless, quieted down, saying "it felt good." The choked disk had measured 2.3

[1] Keen, W. W.: Med. News, Philadelphia, December 1, 1888.
[2] Keen, W. W.: Proc. Philadelphia County Med. Soc., 1889, p. 50.
[3] Ibid., p. 85.

mm. in each eye before the first operation; it subsided six days later to 1.09 mm. on both sides. He died on the fifty-second day.

In the same paper I reported two other cases of tapping the ventricles.

At the International Medical Congress in Berlin, in 1890, I presented a complete paper on the surgery of the lateral ventricles, which was a study of ventricular surgery from the time of Paré to that date. Unfortunately, only an abstract has been published,[2] since the original paper was lost by the secretary of the Surgical Section.

I corrected seven instances of deliberate puncture of the ventricles, with two recoveries.

In 14 cases of rupture of the ventricles from fracture and secondary opening of them (1 of which was the present case), 9 patients recovered.

I concluded, therefore, that such involvement of the ventricles was in no wise so dangerous as had been supposed, except when an abscess burst into a ventricle or a large hemorrhage into it took place. Instances of both of these conditions were cited. Every one was fatal.

Among all these and many other cases I did not find any one at all resembling the present one, nor have I ever seen any similar case reported since my paper in 1890.

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## DISCUSSION

Dr. Charles K. Mills: This case has much interest to me for several reasons: I was present at the operation by Dr. Keen, and it was the second case I had seen operated on for brain tumor, the first having been one by Dr. Weir, of New York, on a growth present in a patient of Dr. Seguin. If I recall rightly, Dr. Keen was present at the operation by Dr. Weir. This was a subcortical growth and the operation was by no means as successful in its results as was that in the case of Dr. Keen, not, however, because of any want of skill on the part of either the diagnostician or the surgeon.

I remember Dr. Keen enucleating this tumor. We were all intensely

interested. As he took it out, he placed it in my hands and afterward I passed it over to the proper parties and later it came back, of course, to Dr. Keen himself. There is much of great interest in connection with this case; in the first place, the long duration of life and the comparatively good health of the patient for so many years—thirty in all. I saw this patient a time or two not long after the operation and again about three years before his death.

There are cases of fibromata which last for a long time and, strangely enough, in a few instances they are not discovered until after the death of the patient. A case of this kind was reported in Edinburgh. The man, a well-known physician, discovered to have in a latent region of the brain a flat, hard fibromatous tumor which had never been diagnosticated.

The appearance and disappearance of the hernia cerebri because of differences in the position of the patient are certainly extremely interesting. When the patient was in a recumbent position the cerebrospinal fluid found its way perhaps through the foramen of Magendie to the spaces around the spinal cord and also perhaps into the extraventricular cerebral spaces. It probably flowed back to its original position when the hernia cerebri was visible.

Another interesting feature of this case is that, in spite of the extreme degree of paralysis present, the patient in the course of years, after going through certain vicissitudes following the operation, was left with little or no paralysis—at least none that was at all marked. With a tumor of this size, located as it was, this would at first be rather difficult to explain. It is not, however, unlike what happens in long-standing hydrocephalus. I know of several cases, one which I recall very fully, of a man with a chronic hydrocephalus, a somewhat well-known character, who lived to about forty-five or fifty years of age. It was found at postmortem that he had an extreme degree of hydrocephalus. In spite of the fact that the brain was reduced almost to a shell surrounding the ventricular cavities, the man had no paralysis. Examination of his brain showed, as above indicated, that the cortex and subcortex had been remarkably compressed. What takes place in such cases may have occurred in Dr. Keen's case—the very gradual compression of the cortex and subcortex may have allowed a sort of functional adjustment. It is rather more likely that this is the explanation than that of compensation by the other hemisphere of the brain.

There are other interesting features of this case, which is one of great historical interest and will remain a classical case in the literature of this subject.

# HOW AMERICA IS HELPING FRANCE WITH HER TUBERCULOSIS PROBLEM[1]

By JAMES ALEXANDER MILLER, A.M., M.D.
ASSOCIATE DIRECTOR OF THE COMMISSION FOR THE PREVENTION OF TUBERCULOSIS IN FRANCE

THE Commission for the Prevention of Tuberculosis in France was sent in July, 1917, under the auspices of the International Health Board of the Rockefeller Foundation, with Dr. Livingston Farrand, formerly executive secretary of the National Association for the Prevention of Tuberculosis as its director. For some time previous, reports had reached this country that conditions in France during the war were not as they should be in reference to the tuberculosis problem. In February, 1917, Dr. Herman M. Biggs was requested by the International Health Board to make a first-hand study of the situation and the sending of the permanent commission was a direct result of Dr. Biggs's report and recommendations.

The more extensive opportunities for study which time and organization offered to the commission have corroborated the essential soundness of Dr. Biggs's conclusions. He estimated that there were nearly 500,000 cases of tuberculosis in France, which he classified into the following general categories:

| | |
|---|---|
| Discharged from Army | 150,000 |
| Still remaining in the Army | 45,000 |
| Prisoners of war in Germany | 20,000 |
| Civilian refugees and rapatriés | 85,000 |
| Among the remaining civilian population | 110,000 |
| Tuberculosis listed under false diagnoses, such as bronchitis, etc. | 30,000 |
| Total | 440,000 |

[1] Read May 1, 1918.

The results of the studies made by the commission thus far tend to corroborate this estimate of the total number of cases, but some readjustment of the distribution seems necessary and is also interesting.

Tuberculosis in the Army. The estimate of 150,000 cases of tuberculosis discharged from the Army seems distinctly excessive. It has been officially reported in the Chamber of Deputies by the Service de Santé de la Guerre that up to December 1, 1917, the total number discharged from the Army for tuberculosis was 89,000 and of these 70,000 were discharged previous to March 1, 1916. The total number discharged from January 1, 1917 to November 1, 1917, was 8276. This would make a probable total for the year of about 10,000. While the exact size of the French Army is not known, on a basis of 3,500,000 men this would make about 0.3 of 1 per cent. discharged during the year for tuberculosis. Moreover, it is the opinion of several of the best of the French clinicians, notably Rist and Sergent, that a very large percentage of the cases diagnosed as tuberculosis in the Army did not have this disease, at least in active form. As high as 40 per cent. of the number is claimed to be actually non-tuberculous. This appears astonishing, if true, and moreover it must be assumed that a good many active cases of tuberculosis are overlooked, but, taken all in all, it is evident that tuberculosis in the French Army is not the serious problem as was first supposed.

It was our frequent experience to hear from French physicians in the military service that in their opinion military life in general predisposed to tuberculosis far less than ordinary civilian life, particularly in cities, and that also in contradiction to the claim that such service brings out latent tuberculosis, they feel that in France such predisposed cases do well rather than otherwise under the Army regime. As to the actual cases still unrecognized and retained in the Army, it should be stated that the efficiency of the medical service in the French Army is now at a high level, and special attention is given to the examination of the chest, so that there is every reason to believe that mistakes in diagnosis do not exceed the normal that would obtain in civil life or in any other army.

Tuberculosis Among the Prisoners of War in Germany. Very few such prisoners have been returned to France, and, naturally, only those who are absolutely unfit for military duty and probably the worst of these, consequently no estimate based upon these insufficient data can be relied upon. In general, we have found no reason to doubt the accuracy of Dr. Biggs's estimate, but it should be stated that we have found no evidence, direct or indirect, to substantiate the tales of inoculation of prisoners of war with tuberculosis. It would seem that the conditions allowed to exist in the German prison camps would render such a refinement of method superfluous.

Tuberculosis among the Refugees and Rapatriés. During the past year an opportunity has been offered to gauge the amount of tuberculosis among this class of the French population because of the fact that Germany has been repatriating large numbers of individuals into France through Switzerland, and these have been subjected to careful physical examination at Evian, which is the point of entry. We have been furnished with the figures of the examination of about 1,200,000 such examinations, which showed only 0.4 of 1 per cent. tuberculous. When we consider that these are groups selected by Germany to be sent back because of their physical or economic unfitness and that they have often experienced months or years of hardship and distress, it would seem that this number is astonishingly small. It must be remembered, however, that they come largely from the rural districts, which, as we shall see later, has a very definite bearing upon this whole problem.

False Diagnoses of Tuberculosis. That a goodly number of cases of tuberculosis are covered under such terms as chronic bronchitis is most probable. Not only is this the experience everywhere where such diagnosis is accepted as the cause of death, but in France the prejudice against the public acknowledgment of tuberculosis in a family is even greater than it is here.

It is interesting in this connection to note that in Paris, where the mortality is the highest, more than 52 per cent. of the deaths reported from tuberculosis occur in hospitals where the greatest accuracy in diagnosis and in record is to be expected. Misleading records probably occur more frequently in the country districts.

Tuberculosis among the Remaining Civilian Population. This category, of course, includes the bulk of the cases. In analyzing the situation, however, two striking features may be noted: (1) that although the death-rate from tuberculosis in France is high, so far as can be judged from available statistics, it has been no higher during the war than previously, and (2) that the increase in the death-rate above the average in France is due almost exclusively to the very high figures which obtain in large cities, particularly in Paris, the conditions among the rural population being not very materially different from those in other countries. These statements are substantiated by the following data, the rates being based upon the census of 1911. The city of Paris death-rate per 100,000 inhabitants from all forms of tuberculosis for the years 1912-1916 were as follows: 1912, 406; 1913, 400; 1914, 410; 1915, 397; 1916, 381.

Of these a large percentage are always non-residents of the city, and this proportion has been materially increased since the war For example, in 1912 and in 1917 the totol number of deaths from pulmonary tuberculosis in the city of Paris was approximately the same (the percentage of such deaths among non-residents in 1912 was 11 per cent. plus of the total while in 1917 it was 16 per cent. plus). Undoubtedly the large number of refugees in the city account for a considerable portion of this difference. The regular health reports of the city of Paris show each week with great regularity that between 20 and 25 per cent. of all deaths are due to tuberculosis. This is approximately double of the experience in New York City.

When we turn, however, to the problem in rural France we are handicapped by the fact that no regular statistics have been published since the war. We have been fortunate, however, in obtaining these for a considerable number of the departments of France. The total for 13 departments which are representative of all of France, and including the department of the Seine (Paris), with a population in 1911 of 7,581,923 or approximately one-fifth the entire population of France, shows the death-rate from tuberculosis as follows: 1912, 290; 1913, 286; 1914, 292; 1915, 288; 1916, 281.

When, however, we omit the Department of the Seine (Paris) we find that the mortality from tuberculosis in 12 rural departments during these years was as follows: 1912, 140; 1913, 131; 1914, 144; 1915, 144; 1916, 140.

These figures show the marked difference between the city and rural death-rate and also bring out the fact that apparently in neither has the war played a dominant role in increasing the number of deaths from tuberculosis. In accepting these deductions, however, concerning the effect of the war, certain very evident sources of error must be borne in mind, such as the probable, considerable decrease in population since 1911, the redistribution of this population because of mobilization of the Army and the displacement of the civilians because of invasion or of development of new centers of industry, and, lastly, because of the necessarily inaccurate records available since the beginning of the war.

The relationship between urban and rural France as it existed before the war and also in comparison with England and the United States shows very strikingly how far the French tuberculosis problem is a city problem, notably Paris, and does much to reassure us that tuberculosis in excessive amount does not exist throughout the whole country, brings out the distribution of tuberculosis in France as a whole. The effect of large cities is noted as the dominant factor, excepting in Normandy and Brittany in the northwestern corner of France. Where special conditions, particularly alcoholism, appear to be an especially predisposing factor the distribution of tuberculosis in Paris shows the greatest mortality is in those sections on the outer edge of the city where the factories are located and where the hygienic conditions are worst. In the sections outside of the city wall the conditions of hygiene and disease are even worse than inside the city proper. We are justified, therefore, in assuming that in France there is no reason for readjusting our preconceived notions of the conditions which predispose to tuberculosis in the light of war experience. It still remains as it was before the war, a disease especially of the civilian poor in large cities.

The Effect of the War. Notwithstanding the above considerations, anyone studying the conditions in France at the present time gets the impression that there are certain factors there which do tend to impair the health of the population and probably, in spite of the data available, to increase to some extent at least the amount of tuberculosis during the war.

The most important of these is the tremendous overcrowding in the large cities due to the influx of population because of new industries and of refugees, coupled with the fact that no new building has been attempted in France since the war. Consequently the industrial and economic pressure is much greater, women and children have been brought into industry much more than ever before and all are working long hours under high pressure and at unaccustomed tasks. To this should be added the fact of the tremendous mental stress through which France has been going, which has undoubtedly hastened the death of many who otherwise might have lived for years.

The food problem, while difficult, particularly for children because of the scarcity of milk and sugar, has by no means approached the point of actual want in France, excepting in the exceptional cases, especially among the refugees. The increased cost of food, however, undoubtedly keeps the food allowance of the population close to if not under physiological requirements. Alcoholism is another factor which undoubtedly plays an important part in a large part of the cities, and particularly in Normandy and Brittany. This is well recognized by all French sanitarians, who hope that some control of the sale of distilled liquors may be one of the results of the war. In spite of all these facts, however, one is strongly impressed with the remarkable way in which the French people have adapted themselves to the stress of circumstances and their economical use of all of their resources to the best advantage.

Infant Mortality. Closely allied to the tuberculosis problem in France, and one which is second only in importance to it, is the problem of infant mortality and of depopulation. Studies of the

tuberculosis problem touch that of infant mortality at all points, and, as we shall see later, we have found it desirable to link up the two campaigns through coöperation with the American Red Cross. This has been done by carrying on the publicity propaganda as one united effort covering both conditions and also by conducting clinics for children in all tuberculosis dispensaries which we have established. Also, Dr. Lucas of the Children's Bureau of the American Red Cross, is conducting a scheme for the training of nurses similar to and in coöperation with the work which our commission is doing along these lines.

As is well known, the problem of depopulation in France has given concern for some years. Since the war there can be no doubt that the birth-rate has fallen very considerably, so that it is well below the death-rate. In consequence, the conservation of the lives of the children who are born assumes the very greatest significance.

The comparative infant mortality rate in Germany, France, England and Wales and New York City shows that France, while in general a little above the last two, has been consistently and distinctly below the infant mortality rate in Germany. The distribution of infant mortality in France as a whole is interesting when compared with the distribution of tuberculosis. The influence of the large cities is marked, but, in general, there is the increase of infant mortality in the south, probably due to the warmer climate as well as to other unfavorable conditions.

The comparative rate between Paris, London and New York shows, as in tuberculosis, the city of Paris with an abnormally high mortality. As in tuberculosis, also, the rural districts do not show a high infant mortality since the war, so that the principal problems in the control of these two preventable diseases appear to center especially in the large centers and particularly in Paris.

The distribution of the mortality from both tuberculosis and infants follows the same general arrangement in the city, being most marked in the sections around the edge of the city just within the wall. It is very evident that by attacking tuberculosis

and infant mortality as a joint problem the American organizations in the field in France are taken to be the two most important factors in the public health situation today. If real progress can be made in these two conditions very definite results in many other phases of the health problem would naturally follow.

French Activities Before describing the tasks of the American agencies which have been at work in helping toward the solution of this tuberculosis problem in France, it is a pleasure to be able to express the surprise which greeted us upon finding how much the French themselves were already doing. Various reports had led us to suppose that their effort had been comparatively slight. Up to the last two years it can be said in general that this was true. There was no compulsory registration for tuberculosis; there were very few hospitals or sanatoria for the care of pulmonary cases; almost no laboratory facilities for diagnosis; no public health propaganda, and in consequence no organized public health sentiment and the governmental budget for health was extremely small, and 40 per cent. of it was spent for disinfection, a method of control for infectious diseases which we have now to a large extent discarded.

On the other hand, however, there were in France a few model tuberculosis dispensaries, probably better than any that we have in this country. There were numerous large institutions at the seaside for the care of surgical tuberculosis in children and a system of placing-out children predisposed to tuberculosis in homes in the country had been highly developed through the Oeuvre Grancher, a system which might very well be imitated to a large extent in this country.

Moreover, a new law had been passed which required that there should be a tuberculosis dispensary in every community where the death-rate from tuberculosis was above the average for the entire country, but the operation of this law has been interrupted by the war.

Since the war there has been organized a central committee in Paris with Department committees in every one of the 87 Depart-

ments of France. These committees were originally intended for the care of discharged soldiers, but they are gradually being extended to care for all cases of tuberculosis among civilians.

Since the war, also, approximately 10,000 beds for pulmonary tuberculosis have been provided in all parts of France in the Stations Sanitaires and Hôpitaux Sanitaires, conducted under the auspices of the Department of the Interior and the Department of War respectively. Also, in addition, there is a well-organized relief agency, the so-called P R 2, for soldiers discharged without pensions, of whom a very large number are tuberculous. It is doing most excellent work.

The idea of sanitary tenements, some of them operated along the lines of the Home Hospital in New York, had already been followed up in Paris and in Lyons.

Two or three schools for visiting nurses, particularly for tuberculosis, have been started in Paris, although their course of training was incomplete, and these nurses were being used largely for the Hôpitaux and Stations Sanitaires rather than for their original purpose as visiting nurses.

The inadequacy of laboratory facilities in rural districts has been partially met by placing the facilities of the Army regional laboratories at the disposal of the physicians practising among the civilian population. This may very well lead to the permanent institution of such laboratories throughout France.

More than this, we were, early in our study, marvellously encouraged for our task by the discovery of a splendid organization already existing in two widely separated areas of France. The first of these was in the Department of Loire, where, through the initiation and under the leadership of the Prefet of the Department, M. Lalleman, the whole Department had been organized for a campaign against tuberculosis, largely with public funds, partly augmented by private subscriptions. There were already ten tuberculosis dispensaries with visiting nurses, and plans under way for eight others, and two preventoria for children from tuberculous families, a hospital for advanced cases and a beautiful sanatorium,

St. Jodard, now used as a Station Sanitaire, but admirably equipped as a modern sanatorium.

The other organization which we found in successful operation was in the Department of Finisterre, where, as in the Department of Loire, the organization was under the auspices of the Departmental Committee, but in this case the local initiative had come from an American woman, Mrs. Edward C. Post. Within less than a year Mrs. Post had been able to fuse all the various elements of the population of her Department into a working organization, with the establishment of four splendid dispensaries. a remarkably efficient corps of visiting nurses and a sanatorium, all of which was done with French personnel and under French auspices. Too much credit cannot be given to these two pioneer Departmental organizations against tuberculosis and their experiences helped us not a little in shaping our own plans.

American Activities. The preliminary survey of the situation having been made, our Commission entered into a working agreement with the American Red Cross which has furnished as splendid an example of coöperation as could possibly exist between two similar bodies. In general, the basis was that the general outline of the tuberculosis campaign and the policies involved should be directed by the Commission, which would have direct charge of the establishment of dispensaries, the training of nurses and the educational propaganda. The Red Cross, on the other hand, was to assume entire responsibility for institutional care, for home relief and for housing. As a matter of fact, this has simply been a working basis, because both organizations have had more or less to do with all branches of the work, and there has been more or less of interchange of personnel, with a complete harmony of direction, due largely to the statesmanlike leadership of Dr. Livingston Farrand, of our commission, and Mr. Homer Folks, of the American Red Cross. So far as actual expenditure of money is concerned, the Red Cross has assumed very much larger responsibilities than has the Rockefeller Commission, and in this the backing of the officers of the Red Cross, both in Washington and in Paris, has

done much to make the work of the commission possible and to establish all the tuberculosis work under American auspices upon a firm basis.

Moreover, it has been our privilege to enter into very cordial relations with the French authorities, both in Paris and in the various Departments of the country, with the physicians—whether professors in the faculties of medicine or general practitioners in the country—and also with the numerous philanthropically inclined individuals with whom we came in contact all over France, perhaps most particularly those connected with the various Departmental Committees and with the French Red Cross. Too much appreciation cannot be expressed of the remarkable cordiality with which we have been received in France, without which much of our effort would have been futile and with which our duty became also a great privilege and pleasure.

Scheme of Organization. Our scheme of organization developed gradually, as follows: (1) an intensive organization in the 19th Arrondissement of Paris, grouped around the dispensary. By this arrangement we assumed the entire responsibility for community tuberculosis work in this arrondissement of about 250,000 inhabitants. Three tuberculosis dispensaries have been established here and a fourth one is under way. A group of nurses, centrally directed, are attached to each dispensary. In coöperation with the Children's Bureau of the American Red Cross, under the direction of Dr. William P. Lucas, it has been arranged that a general children's clinic and infant welfare station should be established at the same time and along the same plans as the tuberculosis dispensaries.

The visiting nurses have been under the direction of Miss F. Elizabeth Crowell, Executive Secretary of the Association of Tuberculosis Clinics in New York, who, from a nucleus of four or five American nurses who spoke French, has developed a staff of twenty-five nurses, most of them graduates of French schools, who have now been trained into efficient visiting nurses by experience in our dispensaries. Miss Edna Leet, formerly of Cleveland, Ohio, and now the head nurse of the Children's Bureau of the Red

Cross, also is directing this group of nurses from the standpoint of child welfare. The arrondissement has been districted and the visiting nurses are doing tuberculosis work and infant welfare work simultaneously in their respective districts.

Where home relief was found necessary it has been supplied primarily through coöperation with the French Public Charities or the private philanthropic societies, scrupulous care being taken to have no duplication of work with them or to in any way encroach upon their jurisdiction. Where means from this source was insufficient, the Relief Bureau of the American Red Cross, of which Miss Margaret Curtis is Director, has supplied the deficiency, either directly through Miss Crowell and Miss Leet or, even more frequently, by payments to the various French societies so that their organization might be strengthened as far as possible and the setting up of a duplicating and necessarily temporary relief organization avoided. To those of us familiar with social work here in America, this plan of coöperation and the use of various agencies to carry out a definite program is most suggestive of the possibility of the wider application of the same principles here. The operation of this system in Paris has been eminently successful and satisfactory.

The housing problem in Paris is one of the most difficult ones to solve. The overcrowding and general lack of hygiene in the tenement districts exceeds almost anything with which we are familiar in our large cities here. This is due to the influx of refugees and of industrial workers and to the fact that no new buildings have been erected since the beginning of the war. Mr. Homer Folks of the Red Cross discovered that there were a considerable number of half-finished apartment buildings in Paris lying idle since August, 1914. He has contracted with the owners of a considerable number of these for the Red Cross to finish the buildings and to apply the necessary expense toward the rental upon a three-year basis. This has made available already additional space for several thousand people and some of this has been put at the disposal of our tuberculous families. One exceedingly commodious apartment building is now being remodelled on

the plans of a home hospital and in this building will also be located our largest dispensary, which will contain the central laboratory, the *x*-ray equipment, the dental clinics, etc., to serve the needs of the other similar dispensaries in the arrondissement.

Institutional Accommodations. In order to make the dispensary work effective, it is, of course, necessary to have adequate institutional outlet to meet the patients' needs. Here again the American Red Cross has supplied this need and has erected several hospitals for advanced cases, sanatoria for more favorable ones and preventoria for children in and about the city of Paris. One of the most interesting of these, situated at Plessis-Picquet, is a beautiful estate loaned to the Red Cross by the city of Paris, the main château of which has been remodelled into a sanatorium with accommodations for 200 patients, and one of the smaller buildings has been turned into a preventorium for about the same number of children. This sanatorium and preventorium has been called the "Edward L. Trudeau Sanatorium in France."

A few kilometers from the Trudeau Sanatorium another property is being developed upon rather unique lines by the Red Cross as a tuberculosis colony, worked out by Dr. William Charles White of Pittsburgh, the chief of the Bureau of Tuberculosis of the American Red Cross and one of the Associate Directors of our Commission. Upon this tract, small portable houses are being erected with a small patch of land about each and families in which there is tuberculosis are being placed there under supervision and with the idea that as far as possible, by means of the garden and the raising of rabbits and of chickens and any other similar ways in which the French are adepts, the family may be nearly self-supporting and at the same time, kept together while the sick member of the family is getting well. This promises to be a very interesting and successful experiment, particularly well adapted to French conditions. Eventually there will be accommodations for between fifty and seventy-five such families in this colony.

In addition to such institutional accommodations directly supplied by the Red Cross, we have made also affiliations with several French institutions so that our dispensary patients may be

admitted to them upon the payment by the Red Cross of a stipulated per-capita cost.

Another feature which has been introduced in Paris, borrowed from the New York City experiments, is the establishment of a hospital Admission Bureau or clearing-house, through which all applications to tuberculosis institutions are made, and assignment to the most suitable institution is therefore possible. In a similar way this clearing-house acts as a distributing center when the cases are discharged, the proper dispensary being notified, so that the case may be followed up in the home. It is hoped that the establishment of this Admission Bureau may be gradually extended to include all French tuberculosis institutions and may, therefore, eventually become a permanent organization.

The above described organization constitutes the armamentarium for one single Arrondissement in Paris for which American agencies have assumed entire responsibility and serves not only the purpose of providing this additional care for patients, but also as a demonstration of American methods adapted as far as possible to existing French conditions. The direction of this work has been under the immediate charge of Dr. Bernard L. Wyatt of Louisville, Kentucky.

Intensive Organization in a Department in the Country. In order to make our demonstration more complete, it was thought wise to take a typical rural section of France and develop it along the lines already described for the 19th Arrondissement of Paris. After a very careful study, the Department of Eure-et-Loir, of which Chartres is the principal city, was selected. The population of this Arrondissement is about 160,000. Chartres has a population of 25,000, the next largest city, Dreux, 10,000, and the rest of the population is contained in smaller towns and villages. The Department is in the main agricultural but the city of Dreux is a thriving industrial center. We have been most fortunate in obtaining the cordial sympathy and hearty coöperation of all the local authorities in the Department who have placed every possible facility at our disposal. Dispensaries have been started at Chartres, at Dreux, at Château dun, at Nogent le Rotrou and at Saint Remy, the last mentioned being an industrial dispensary in connection with the Waddington Mills.

Hospital supervision has been provided at Chartres and at Dreux and plans are under way for the erection of a sanatorium. The same methods have been employed as those used in Paris, including the establishment of children's dispensaries, the training of visiting nurses, the coöperation with local physicians, the provision for home relief, etc. The direction of this work in the Department of Eure-et-Loir has been in the hands of Dr. David R. Lyman of Wallingford, Conn., who has made a splendid success in the preliminary organization.

Coöperative Efforts. In addition to these two intensive organizations, we have followed the policy of coöperation with existing French dispensaries in various parts of France. Our plan is to make a survey of the situation and to help either with medical and nursing personnel or with contributions of money, requesting that certain standards of work be maintained and that regular reports be made to our central office. Frequently, we have either sent our own doctors and nurses to help in the organization of these dispensaries, or nurses have come up to work in our dispensaries in Paris for two or three months in order to learn our methods of supervision and relief. The most successful of these coöperative efforts has been in the city of Blois, where under the auspices of the local committee, stimulated by the keen interest of Mrs. Eugenie Hatch, of Boston, a splendid French Red Cross dispensary has been turned into a combined tuberculosis and children's dispensary, organized in a similar way to those in Paris. In this particular instance the physicians and nurses have been largely American.

In other instances, however, as at Lyons and at Chalons, the dispensaries were entirely French and we have simply aided in a financial way with a certain amount of advice and guidance. Opportunities to extend this coöperative work are multiplying every day and our ability to help dozens of such dispensaries throughout France is limited only by the lack of properly trained personnel, particularly visiting nurses.

A Few Statistics. Altogether, in the various dispensaries immediately under our care, we now have over 1500 new patients in attendance and 1350 families were under supervision April 1,

1918. This number is increasing very rapidly, both because of the increased attendance at existing dispensaries and the establishment of new ones and, inasmuch as the first dispensaries only opened in November, 1917, and the second one not until January 1, 1918, it is evident that in a very short time a not inconsiderable amount of work has been done.

The institutions established exclusively by the American Red Cross for the care of tuberculous patients up to April 19, 1918, had a capacity of 450 patients. These are mostly near Paris, but include also a hospital of 130 beds near Lyons. Not only, however, has the Red Cross supplied the urgent need for hospital beds but, also, they have done much to make more effective the care supplied in numerous French hospitals in Paris for tuberculous men and also the numerous stations sanitaires and hôpitaux sanitaires scattered throughout France. A regular system of visitation of these institutions has been established and all sorts of necessities and comforts which the limited governmental appropriation did not permit, have been provided. Up to the middle of April, 275 such hospitals, representing over 23,000 beds, had been assisted and 850,000 francs had been expended in various forms of relief. The results of this help have been striking, not only in the increased comfort of the patients but also in their willingness to stay in these institutions, thus materially increasing their effectiveness.

The Training of Visiting Nurses. It is generally known that France has not enjoyed the same facilities for the training of nurses as has either the United States or England. This is due largely to the fact that until a few years ago the nursing of the sick was entirely in the hands of the nuns, but, since the separation of the Church and the State, schools for nurses have developed in France more rapidly and are just beginning to somewhat approach the standards which obtain in this country. The extension, however, of nursing work to the homes by means of visiting nurses has been almost unknown until the last two or three years, when as has already been stated, two or three schools for the training of such nurses have been established. These, however, are inadequate in number and the required standards for social work are

not the same as ours. We quickly realized that one of the chief needs in France today is a large number of trained women to visit the sick in their homes, particularly for tuberculosis and infant welfare but, also for all other social diseases.

We therefore consider that we have been particularly fortunate in having established a scheme of coöperation with three of the best schools existing in Paris and a fourth one in Lyons. By this plan these schools have agreed with us upon a mutually satisfactory curriculum of one year, our Commission undertaking to provide necessary money to carry on these courses, largely through the payment of the living expenses of the pupil nurses, but also by supplying necessary equipment where lacking. We found that the theoretical training given to nurses in Paris and also in the practical work in institutions, was splendid in every respect but there appeared to be a lack in the training for the practical work involved in visiting homes, that is, the social work. In Paris, therefore, and later we shall do the same thing in Lyons, we have engaged to take as many of these students as possible into our own dispensaries and give them their practical training in visiting work there. Not only were we fortunate enough to achieve a common basis for the curriculum but also, through the coöperation of Professor Edouard Fuster, of the College de France, it was arranged to give the students of all three schools in Paris a common course of lessons in the principles of social work. Under this arrangement Professor Fuster is to supervise this course and to give most of the lectures, but upon his invitation, Dr. Richard Cabot, who was in Paris last winter, detailed from the Army for Red Cross work, also gave some of these lectures in French, thus bringing to France the inspiring ideals which have made him the pioneer of medical social work in America.

Inasmuch as the need for visiting nurses was urgent, we, in addition to the regular curriculum just described, arranged for two shorter courses, one of three months of practical visiting work in our dispensaries—open to French graduates in nursing. The second shorter course is of six months' duration and is open to French women who, without having had a regular training, have

had, nevertheless, since the beginning of the war considerable hospital experience in taking care of the wounded and in consequence, have already become quite proficient in the technic of hospital work. Fifty of these nurses will be available July 1, 1918, and at least fifty additional will be ready January 1, 1919. We consider that this has been one of our most successful achievements and will do not a little toward enabling us to attain our chief object, that is, to make our work in France permanent by developing French personnel which will ultimately make it entirely independent of American aid.

Coöperation with Physicians. As all physicians of military age in France have been mobilized, only the elderly men and women physicians remain. It has been our policy to coöperate with them in every way possible by making them members of the staff of our dispensary, by soliciting their interest and sympathy in our work and by placing our facilities at their disposal for diagnosis and treatment or any other aid for their patients. Not the least important result of this policy has been a most interesting and valuable interchange of knowledge and methods between the physicians of France and America. Not only has this taken place in the case of individual physicians but also the members of the Faculty of Medicine in Paris and in Lyons have expressed their keen interest in our work and their willingness to coöperate, even suggesting that we offer courses in diagnosis to the students of their medical schools. This undoubtedly will later be done.

We have carefully avoided in every way possible the implication of any superiority in our methods, for in fact, as is well known, the leaders of French medicine always have been our clinical masters. We have also avoided possible friction arising from interference with the private practice of physicians, insisting that patients at home be taken care of by their own physicians and in some cases we have been paying French physicians to make such visits in the homes for us. By inviting these physicians to attend our dispensary sessions, and in the country especially to bring difficult cases for special study and consultation, we have not only escaped any professional antagonism but have on the contrary developed in

many instances a very cordial spirit of professional coöperation. That this will mean in the future a great deal to the international medical relations between France and America is already evident.

Educational Propaganda. Probably the most interesting and successful feature of the work of our Commission has been the educational propaganda developed under the direction of Professor Selskar M. Gunn in coöperation with Mr. Pratt of the Children's Bureau of the American Red Cross. After heart-breaking and discouraging delays and disappointments due to the confusion of war this campaign was started early in January. The plan consists in having several educational automobile units, comprising moving picture machines, a travelling exhibit, a mass of printed literature and posters and lectures on tuberculosis and infant welfare, all heralded in advance and kept before the public by a well-organized press campaign. Three of these units have already begun work and it is planned to have twelve in all before the end of the year. The success which has attended the meetings and exhibitions already held has been astonishingly great, far beyond our highest expectations. Not only have all the well-recognized methods of propaganda with which we are familiar here in America been used but, also, Dr. Gunn and Mr. Pratt have developed many unique features, especially the use of cartoons which are strikingly successful and might well be imitated in this country.

The meeting places have invariably been packed for these exhibitions and attended by nearly all of the population of the towns visited and the enthusiasm has not only done much to extend public health propaganda but, what is even more striking, has aroused a tremendous enthusiasm for America among the French people. No more stirring experience can be had than the privilege of watching the effect of this American effort among the French people, not only from the immediate educational results attained but also for that strengthening of deep feeling between the two nations which means so much during the stress and strain of these hard days of war.

As an inevitable result of all this educational work the demand on our resources to supply the more tangible help, such as dispensaries,

nurses, hospitals, sanatoria, etc., are increasingly great, and it would appear as though our possibilities of usefulness would be limited only by the means and personnel at our disposal. When we look back over the few months of work in France and realize how steadily our plan for a public health campaign has developed and grown, we feel that there is every reason to be most hopeful and enthusiastic for the outcome of the future.

In conclusion, I think that it is a fair statement to say that in the face of the many obvious difficulties of the present situation in France, a very satisfactory beginning has been made through American agencies toward a helpful organization of the campaigns against both tuberculosis and infant mortality.

That such a beginning has been possible is due mainly to the cordial spirit of coöperation manifested by the French themselves, who need the encouragement and assistance that America has brought to them, only to tide them over this present period of terrible strain and stress. As soon as the burden of the war is lifted it is very certain that France is ready to achieve a development in public health control in marked contrast to her previous indifferences and inertia, and all of the signs point to this being accomplished with the same brilliancy and efficiency with which we have long learned to associate the name of France in so many other spheres of activity. That America has been able to have a part in the beginnings of this great movement undoubtedly will do much to strengthen the ties of affection and mutual interest which bind these two great Republics and to those of us who have been privileged to share in this work itself, it will always remain one of the great and deep experiences of our lives.

# TUBERCULOSIS IN THE ARMY[1]

By Colonel GEORGE E. BUSHNELL
U. S. ARMY, RETIRED.

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The response from Philadelphia to the call of the army for physicians has been very gratifying and I am exceedingly glad to have this opportunity to pay a tribute to the profession of this city.

In examination of men for the army the welfare of the army is the first consideration. The examination should be made rapidly with the idea of excluding manifest tuberculosis, of getting the affected men out quickly and filling their places without delay. The examinations were therefore made in what might be called a wholesale manner and had to be performed quickly. The idea of speed was extremely foreign to most examiners accustomed, as they were, to examine in the most leisurely way, and it took some time to get the idea thoroughly before them. The work was standardized by instructions sent from the Surgeon-General's office which directed, among other things, that each examiner should make a minimum of 50 examinations per day. Most of the examiners thought it to be quite impossible to make the examinations in this way, believing it better to wait until the cases were referred by the regimental surgeons as they chanced to find them. It was obvious, however, that with such a method the matter would be too long delayed, and there was the further very serious objection that the delay in detecting tuberculosis would create the incorrect presumption that the disease had been contracted after

[1] Read May 1, 1918.

entrance and was, therefore pensionable. I am glad to say that some of the examiners who were at first skeptical became very enthusiastic later concerning the plan.

Although this plan had some manifest disadvantages, it had the advantage that it tended to prevent too much weight being given to signs of slight organic change. There was simply not time enough to look for them. The danger, of course, would be that if those who believe that any evidence of an old healed obsolete tuberculous lesion is sufficient cause for rejection were afforded time for a minute examination, many men who are perfectly fit to serve might be rejected with injurious results to the army. The opinion is often expressed that a man who shows the slightest evidence of a quiescent pulmonary lesion is in great danger of developing an active tuberculosis if he leads the life of a soldier. As a matter of fact, however, the opposite is true. A man who enters the military service with a not too large quiescent pulmonary lesion as a rule improves in health in the long run in army life.

With regard to the kind of lesion which should lead to rejection, directions were given that all cases of active tuberculosis should be rejected also those with inactive lesions if of any considerable size. Quiescent lesions above the clavicle were not regarded as of sufficient size to reject, but if the lesions were well marked and extended well below the clavicle, they were considered cause for rejection. Many examiners attempted to define exactly the size of the lesion which should not be accepted, but it is manifest that the intensity of the former disease is of more importance than its extent, some diffuse and obscure lesions simply representing a thickening of the connective tissue with perhaps a few small fibrous or calcified tubercles of no clinical significance.

A further provision was that the diagnosis must be based upon positive signs. The civilian physician has but one interest to consider. The army physician has to think of the Government as well as of the individual; there must, therefore, be no doubtful diagnoses. Many of the examiners found cases of what they considered to be arrested tuberculosis which they wished to so label, retaining the men in the service and directing that they be

frequently examined. That was a great mistake for a number of reasons. In the first place, if you tell a man he has arrested tuberculosis he does not understand the distinction which you would make. He worries unnecessarily about his condition, tries to be excused from duty and is spoiled as a soldier because he believes that he is threatened with an early death on account of tuberculosis. Yet such men may be the very best physical specimens we have. The company commander will do the best he can to get rid of any one who is said to have had tuberculosis. It is, therefore, unwise to let the line officers suspect anyone you wish to keep in the army to be tuberculous in any sense of the word. Again, if a man comes in in good health and develops tuberculosis he has a right to a pension. If labeled tuberculous from the beginning, this presents a bar to his being pensioned, which I consider an injustice.

How successful were the examinations? It is impossible to tell. I do not think a large percentage of men were rejected who ought to have been kept in. In such a vast number of examinations it is not to be expected that all could be made as one would have wished.

The views regarding the interpretation of signs are interesting. We might say there are two schools represented in diagnosis of tuberculosis: First, the old school which does not make a diagnosis of tuberculosis until the signs are clearly marked. The other group perhaps should not be called a school because it is composed of a number of individuals who do not agree with one another; of people who write about tuberculosis, who have special ideas as to how to make the diagnosis of early tuberculous lesions, yet whose ideas do not agree. I am not referring exclusively to the profession in this country. There are many throughout the world who are on the search for clinical signs by which tuberculosis can be detected before the supervention of the ordinary signs.

Dr. Miller has referred to the percentage of tuberculosis in the French Army. In the first year of the war it was stated by Landouzy that 86,000 men had been found to have tuberculosis. These figures were considered very ominous and formed the basis of much pessimistic literature. About three months ago, however,

Col. Dercle received official word from the French Secretary of War that of this number considerably less than 50 per cent. were found upon reëxamination to have pulmonary tuberculosis. It is believed by some French authorities that 20 per cent. represents more nearly the true percentage of tuberculosis in this group on reëxamination after an interval of about three years. But if it were 50 per cent. it would still mean that the transcendental diagnostician is wrong, that you cannot safely diagnosticate tuberculosis until you have definite signs. I consider this experience a vindication of what you might call the old school.

Another interesting point brought out in connection with the experience of the French Army is that soldiers do not become infected with tuberculosis in army life if they start out in health. Much has been said of the danger of infection of one adult by another. It is astonishing how widespread this idea is in the lay population. I may remind you that Landouzy who himself was rather inclined to take a pessimistic view, stated that the men who did develop tuberculosis in the French Army did not take it from one another. A study of cases did not show that the disease had been transmitted, but that the men who broke down brought the disease with them. That I consider a very important observation. As Dr. Miller said, tuberculosis does not seem to result from contact under ordinary circumstances as much as might have been expected.

The experience with the repatriated French civilians which he reports is a striking illustration of the fact that even semi-starvation and hardships of all kinds do not lead necessarily to the development of tuberculous disease on a large scale.

We may conclude then that soldiers who live out of doors and are well fed are not in much danger of developing tuberculosis from contact with the tuberculous.

Another interesting point in military practice was that all cases of measles were examined after recovery and again a month later to ascertain whether tuberculosis was present as a result of the measles. Of 5945 cases of measles 173 men were found to have tuberculosis, or 2.91 per cent. I do not think, however, that these

figures are of much value. Many cases may develop tuberculosis later which do not now show the disease. It is also likely that a number of those said to be cases of tuberculosis are simply cases of unresolved pneumonia or of other respiratory affections. It would seem that if measles had really a causative effect in tuberculosis we ought to get a higher percentage than 2 per cent. As yet the investigation is incomplete.

As to the care of the tuberculous soldier. The Government desires to keep every tuberculous soldier in the service as long as he can be induced to stay and to do everything possible to restore him to health. In order to take care of these soldiers, seven institutions for the treatment of tuberculosis have been provided. Three good-sized hospitals are in process of construction and others are being remodelled for use as tuberculosis hospitals. How many will take advantage of this is not easily determined. As soon as a man finds he has tuberculosis, as a rule, he desires to be discharged. It will probably be impossible to retain soldiers indefinitely in the service who demand their discharge. The number of men who will remain under treatment will depend very much upon the matter of their compensation. If the regulations adopted are such that they receive as much money if they go out as if they remain in the service the majority of the tuberculous soldiers will take their discharge.

I believe that a great deal of good has been done by the examinations. We, however, look forward with a good deal of pessimism to the near future for the reason that the men of the new drafts are going to come in very fast and we have not enough physicians to examine them in the time allowed. From now on I am inclined to think that we shall have rather more cases of tuberculosis than less. The following statistics represent the facts of the tuberculosis work up to the present time.

Memorandum to Colonel Bushnell:

April 22, 1918.

Subject: Tuberculosis examinations.

1. Examinations for tuberculosis have been conducted by boards at all the National Guard and National Army encampments and

at 95 other different stations and locations throughout the United States. In these examinations over 600 different examiners have been used. Thirty-five boards of examiners are now at work in the different army cantonments and stations. Three hundred and sixty-four officers of the Medical Reserve Corps and Contract Surgeons are now serving under the Tuberculosis Section. These are distributed as follows:

193 on duty as examiners at various army camps and stations throughout the United States
50 on duty at tuberculosis hospitals,
4 on duty at general hospitals as tuberculosis specialists,
35 on duty as tuberculosis specialists at base hospitals,
34 on duty as division tuberculosis specialists,
12 as instructors at the Medical Officers' Training Camps, at Fort Oglethorpe and Fort Riley,
2 as instructors at the Army Medical School and Walter Reed General Hospital, Washington, D. C.,
24 under instruction at the Medical Officers' Training Camps at Fort Oglethorpe and Fort Riley,
9 as tuberculosis specialists at recruit depots,
1 in France.

2. 190,398 of the Regular Army have been reported as examined to date, showing 1444 cases of tuberculosis recommended for discharge, or 0.758 per cent.

3. Complete reports of 15 divisions of the National Guard have been received to date, showing a total of 385,990 examined with 4381 cases of tuberculosis, or 1.135 per cent. Of these examinations 69,723 were reported as having been examined in armories prior to arrival at encampments, and 318,267 were examined at camps.

4. In the National Army encampments the boards of 12 divisions reported 341,833 examined with 2414 cases of tuberculosis detected, or 0.706 per cent.

5. The tuberculosis specialists at the various Base Hospitals in National Army encampments have reported 3416 cases of tuberculosis as having been referred to them, with 3255 cases rejected. These cases were referred from tuberculosis boards, regimental surgeons, and ward surgeons of base hospitals.

6. Examinations by special boards at 32 stations, Coast Artillery Corps, showed 297 cases of tuberculosis from 40,396 men examined, or 0.735 per cent.

7. The examination of the United States Army Ambulance Service of Allentown, Pennsylvania, an organization composed largely of college men, showed 6116 men examined, with 26 cases of tuberculosis, or 0.425 per cent.

8. A special board at the Port of Embarkation, Newport News, Virginia, examined 8374 men of colored stevedore regiments, reporting 68 cases of tuberculosis, or 0.812 per cent.

9. The examiners at aviation camps have reported 29,033 examined to date with 40 cases of tuberculosis, or 0.137 per cent. These were picked troops and had been carefully examined upon entrance into the service.

10. The highest percentage of tuberculosis reported from any of the National Guard encampments was from Camp Kearny, Cal., at which place 958 cases were found during the examination of 19,827 men (4.831 per cent.). The examiners at this place stated that the high percentage of tuberculosis was due to the fact that many of the troops consigned to the camp were "health seekers" from the states of California, Colorado, New Mexico, Utah and Arizona.

11. In the examination of 11,195 men at Camp Wadsworth, South Carolina, only 15 cases of active tuberculosis were reported (0.133 per cent.). These troops were composed of National Guard organizations from the state of New York, and the president of the Examining Board stated that in his opinion the low percentage of tuberculosis found was due to the fact that the officers of the various organizations had taken an unusual interest in their men and appeared to know their physical condition. The physically deficient had been discharged as far as possible previous to examination by the Tuberculosis Board.

12. In the National Army camps the highest percentage of tuberculosis reported by the Examining Board was at Camp Taylor, Kentucky, at which place out of a total of 20,671 men examined, 334 cases of tuberculosis were detected (1.6 per cent.).

During this examination 469 cases of tuberculosis were rejected by the tuberculosis specialist at the Base Hospital. This number includes cases detected by the Tuberculosis Examining Board, also cases referred by regimental surgeons. The troops at this camp were drawn largely from the States of Indiana and Kentucky.

13. The Examining Board at Camp Sherman, Ohio, reported 33,704 men examined with 91 cases of tuberculosis rejected (0.269 per cent.). The president of the Examining Board claimed that low percentage of tuberculosis was due to the fact that a more thorough examination of these troops had been made by the draft boards and regimental surgeons prior to the examination by the Tuberculosis Examining Board.

14. All troops in National Army camps had been examined by draft boards and regimental surgeons prior to examination by the Tuberculosis Board.

15. An examination of five Howitzer Companies at Fort MacArthur, California, showed 103 cases of tuberculosis from 501 men examined, or 20.55 per cent.

16. An examination of 87,944 new draft troops showed 700 cases of tuberculosis rejected, or 0.795 per cent.

17. The total number of men examined as reported to date is 1,066,119, with a total of 9120 cases of tuberculosis, or 0.855 per cent.

18. The total number of discharges for tuberculosis as reported to the tuberculosis section to date is 8782, or 96.29 per cent. of the total number of cases of tuberculosis reported as having been found. Of 5945 cases of measles reëxamined for tuberculosis, 173 developed the disease—2.91 per cent.

19. Hospitals for the treatment of tuberculosis are now in operation at Fort Bayard, New Mexico; New Haven, Connecticut; and Markleton, Pennsylvania; one is being organized at Waynesville, North Carolina; and one at Whipple Barracks, Arizona; one is under construction at Otisville, New York; and one at Azalea, North Carolina; and the construction of one at Denver, Colorado, has been authorized.

## DISCUSSION ON THE PAPERS OF DR. MILLER AND COL. BUSHNELL

Dr. M. Howard Fussell: Col. Bushnell referred to the feeling of some of the examiners that since their examinations had to be made so rapidly they would be worthless. When we reached Ft. Niagara, being one of the first commissions sent out, we received instructions from Col. Bushnell that each man was expected to examine fifty men a day. We had planned to work eight hours a day. I remember that Dr. Riesman and I said it would be impossible to examine this number in a day. We found, however, that Col. Bushnell was absolutely correct. It was really quite easy to examine fifty men a day after we became accustomed to the work. We had arranged to commence at eight o'clock, work until twelve and then from one to five. We found, however, that we could finish the examinations by four o'clock and I presume we made no more mistakes than we should have under different circumstances. I supposed that examining fifty men a day would pall on us, but it was an interesting experience, and, as a matter of fact, I was rather sorry when the work was done; it had been rather a vacation to us than actual work.

Dr. Thomas McCrae: Any comments which I have to make are based on experiences "at the other end of the funnel," so to speak. Having had the experience of handling the men from the front in a base hospital, one impression I have had fully fixed in my mind is that it is perfectly absurd to hold the view that a man who has had tuberculosis is probably going to be benefited by going to the front. When you consider the tremendous strain of being in the trenches, the loss of sleep, the crowding together in small areas, nearly all the men with some bronchitis, to argue that a man who has once had tuberculosis is not running a risk seems to me absolutely absurd. Would any of us think of subjecting our patients to such a life or to anything approaching it? Would any of us who had had tuberculosis and who are now in health, consider living such a life? Why should we say that probably the soldiers will be benefited by it? You may say that this applies only to the men at the front line trenches, but it was very significant in the work I had, particularly with the Canadian soldiers, to find among the men who went over in the labor battalions and who were living under healthful conditions, without the strain, the number who came in with tuberculosis. Of these, probably the vast majority had the disease before. None of us know how many cases of tuberculosis in adults are instances of fresh infection and how many are the lighting up of old lesions. I had man after man come to the hospital

from the front-line trenches who had "carried on" in spite of illness and whose sputum was teeming with bacilli. Would any one of us want to sleep in a dugout with two or three such men disseminating tubercle bacilli? Would any of us, however little we believe in the transfer of infection in adults, willingly expose ourselves to the possibility of such infection? I don't think many of us would wish to so expose ourselves. It may be difficult to diagnose tuberculosis in civil life. You can multiply that by twenty in the soldier, particularly after he has come back from the front. He has lost weight, has severe bronchitis; many of the men have bloody sputum; they probably have fever even though they do not have tuberculosis. With such a condition you have to make a diagnosis quickly. The examiner who passes a man with the signs of old tuberculosis is sowing the wind and the medical officer abroad is the chap who will reap the whirlwind. From seeing the work "at the other end of the funnel" I believe we cannot be too rigid, for the sake of the Service and for the man, in the matter of our examinations for tuberculosis.

Dr. Judson Daland: I am especially interested in the splendid paper of Dr. James A. Miller, which incorporates so many valuable and useful observations regarding the tuberculosis problem in France. A year ago we were receiving numerous reports to the effect that the mortality and morbidity from tuberculosis in France were exceedingly high, that it was especially prevalent in the rural districts and that there was considerable doubt as to whether it would be possible to secure the coöperation of the sanitary officers in France in the efforts to control the spread of this disease. Dr. Miller's observations clearly show that rural tuberculosis in France is no more common than here and that the center of this disease is chiefly in Paris and in those cities possessing a large industrial population, which is also true of this country. Many thoughtful men were apprehensive that tubercular infection of our troops was exceedingly likely, and it is most gratifying to learn that these apprehensions are baseless.

Dr. D. J. McCarthy: In presenting a review of the Russian conditions to the College a short time ago, I called attention to some figures which support what Dr. Miller has said in connection with the low percentage of tuberculosis in the Russian Army. Conditions in the front line were worse than in the Reserve Army yet the percentage of tuberculosis was lower. This was explained by the lack in Russia of medical attention in the Reserve Army. The percentage of tuberculosis in the Army was lower than in the civil population. I presented figures showing the rejections for tuberculosis in the recruits

in the Army for ten years, in which careful examination made of the sanitary service of the Army included examination for tuberculosis. It was this careful examination for the exclusion of tuberculosis which kept the tuberculosis percentage relatively low. In connection with the statistics of repatriated prisoners from Germany and Austria, I feel that little dependence can be put on figures in estimating the total number of cases of tuberculosis among them because only the ill are returned. I was in touch with the Rockefeller Commission in France last fall when I came through and I was deeply impressed with the scope of the work and the personnel of the Commission. I feel that I may call attention to this which Dr. Miller modestly would not speak of. Probably the largest part of their problem might be expected in the natural antagonism from the medical profession. All, however, were enthusiastically in favor of the work being done by the Commission. We have heard simply a brief outline of the work the Commission has done and it is certainly to be congratulated upon what it has accomplished.

Dr. Charles J. Hatfield: It has been of very great interest to all of us to hear these papers from our distinguished guests. The account of the work of the Rockefeller Commission in France is, of course, inspiring. The account of the regulations for tuberculosis in our Army is of even more immediate interest. I should like to bear testimony to the fact that Col. Bushnell, besides being very enthusiastic, is also very patient, because he receives many suggestions from people interested in tuberculosis. It is also of great interest to have the point of view from "the other end of the funnel," as expressed by Dr. McCrae. Dr. McCrae gave expression to a feeling which I am sure has been held by many of the examiners as to the great difficulty of obtaining any standard by which a tuberculosis patient that has once been diagnosed can legitimately be included in the Army. I should like to ask Col. Bushnell in this connection, how can an examiner, where the signs of tuberculosis have been demonstrated, certify on paper that the man is sound—that there is no tuberculosis? I understand that if the tuberculosis is actually recorded, such record will follow the man, will be known to his superior officer, and that it will have an effect upon his compensation later. Of course, we all realize that Col. Bushnell's extensive experience in handling tuberculosis patients in military service has given him a basis for his opinion of improvement under working conditions, and that his opinion must be highly considered. Before sitting down I wish to state that in connection with the National Association it has been my privilege to see how splendidly the Surgeon-General's Office has considered the various conditions that enter into the questions of tuberculosis in the Army and how broadminded the Office

has been in its coöperation with outside agencies wishing to have certain conditions fulfilled. It is my belief that our Army as it stands today with the various measures put in force by the Surgeon-General is in a splendid condition. What will be the case with the next draft I do not know.

Col. Bushnell (closing): The difficulty a great many people have is in understanding how a man who has at any time had signs of tuberculosis can ever be regarded as a safe man. All depends upon what you mean by tuberculosis, how much tuberculosis there has been, how many bacilli there have been present. There is hardly a man in my opinion who, if looked at closely and studied with the *x*-ray, would not show some little signs of abnormality somewhere in the lung. I believe that some examiners could find that 90 per cent. of those present have what some would call evidences of healed tuberculosis. I am in a position to see both sides better than the man in the hospital practice who sees only the failures. I have a great many people come to me with the diagnosis of active tuberculosis in whom we can find no signs at all. Others give a diagnosis of healed tuberculosis and we can find nothing more than the signs which occur in almost any one, all the way from a misinterpretation of the normal signs in the right apex to a slight degree of evidence of old trouble. The longer I study tuberculosis the more impressed I am with the fact that many perfectly healthy people show slight evidences of organic change in the apices of the lungs. It is one of the most difficult things in medicine to draw the line of demarcation between that which is normal and that which is abnormal in the apices, and to decide how large a healed lesion may be safely accepted for military service. It is a question of what you call tuberculosis. If all cases diagnosed as tuberculous by anybody must be rejected you have your army knocked all to pieces. Just consider the French Army, how badly they wanted soldiers at the time of the Battle of the Marne! They were then sending them home in large numbers. Now after three years it is found that one, possibly two, whole divisions of them did not have tuberculosis at all! We find the same conditions in our Army. Of 80 men sent back from abroad in one lot, only 25 were found by Dr. Webb to have signs of tuberculosis. Those coming over and being sent back cost the Government $5000 apiece. They will have to be returned to the front again because there is nothing the matter with them. A local and temporary condition was called tuberculosis. The same thing is seen all through the camps. The reason why we cannot get together better on this subject is because the pathologist and the hospital physician see only the bad cases while we see also the good cases.

# NEUROPSYCHIATRY IN THE ARMY[1]

By Colonel PEARCE BAILEY, M. C., N. A.

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It seems to me that the city of Philadelphia and the College of Physicians is the most natural place in the world in which to speak upon any subject connected with the medical department of the army. The founders of this College, Shippen and Rush, were prominent in the Revolution and, each of them, I think, at one time served as Surgeon-General. I do not think a neurologist could spend an evening talking about the Civil War without recalling the matchless work of S. Weir Mitchell in his monograph on *Injuries of the Nerves.*

I do not know what proportion of the Fellows of this College have volunteered their services, but almost one-half, I am sure. I wonder that you have any audience at all left.

The medical department of the national army is at present divided into two groups—not divided against itself—but the situation is such that there are really two medical departments: one here, and one on the other side. Those of us who have the fortune—or misfortune—to be on this side, supply what the others want. I do not know what proportion of the medical department will ultimately be here, and what over there. I am sure that very much more than half will be sent over there. The young men and many of the older men who a while ago were extremely impatient to go, and thought they never would get over, are now gone. We do not get very much idea of what the arrangements are over there, due to the fact that they are constantly changing. We easily

[1] Read June 5, 1918.

understand that the German drive has put a new aspect upon affairs, and that plans made here before March 21 may be of no value when the men arrive. Therefore, we simply supply good material which is placed as needed. I think I cannot better give you an idea of the spirit of those over there than by reading a few extracts from letters received by my friend, Lieut.-Col. Thomas W. Salmon, who went over last December. He has covered himself with glory and brought our work to a high point of efficiency and military usefulness. He has become a good military man aided by his genius for organization. He is a great humanitarian and has had long experience in State hospital work and in the Public Health Service which, better than any other profession, fits a man for the rapid diagnosis to be made in the army. (Extracts read.)

That is the vision of the life on the other side and that is about all I fancy that an officer on the other side is expected to write to his friends.

Now the work that is going on on this side is in the nature chiefly of examinations which will determine whether or not men are to be allowed to go across the seas to be subjected to those great difficulties and hardships. The first examinations are made during the training period. We follow one or two methods, one method being a rapid survey of the whole organization, of all the troops, officers included. All pass under the eye of one or more neuropsychiatrists. They are given a test of about a minute and a half, long enough to test the knee-jerk, tremors of hand and tongue, and the reaction to the immediate situation. The test is sufficient to determine whether or not the man should have a more extended examination. The other method used much in the first draft and before the neuropsychiatry department was organized was a method of referred cases, in which only those referred by other officers, line or medical, were examined. The company commanders would refer men who showed peculiarities in drill, epileptic attacks, etc. We had in this more coöperation from the laymen than from the medical officers. There was more indifference or even resistance to this work among the medical officers than among the laymen. All that is now passing away and we are having very close coöper-

ation from every one. It was seen at the outset that it would be unwise for the special officers to be solely concerned in the matter of discharge from the army. The medical department is with few exceptions an advisory department. The medical officer does not discharge soldiers. He recommends the discharge to the commanding officer of the camp. It seemed wiser that the psychiatrist should not recommend a discharge directly to the commanding general without it going through other medical officers. We felt that if we should obtain a recommendation of discharge of 6 or 7 per cent. the work would receive the name of specialism and might be done away with altogether. Therefore recommendations on the part of neurologists have gone through the disability boards composed of three or four regular medical officers. Every recommendation resulting in discharge is thus endorsed by at least three non-specialists. Our function in the fighting is purely preventive, the idea being that a medical officer who knows his troops well will know the men who are neurotic and on the point of becoming nervous and upset. His function will be to talk with these men, to see that they get rest. We believe by such means neuropsychiatry will reach a point of preventive medicine of high significance. In the reconstruction of the soldiers we feel also that the neuropsychiatrist will have an important function. Our organization has examiners at the camps, at depots and ports of embarkation. A certain peccentage of the men are found to be nervously unfit. Not many neurological cases have yet been returned from the other side. We have just secured a hospital at Plattsburg and patients are transferred there from the cantonments as fast as possible. How much these cases differ from the war neuroses of the other side I do not know. We feel almost certain that there are no neurotic symptoms produced on the front not to be found here. We hope in this way to establish a mass of very important information in regard to the position of the neuroses in the army which is not now collected. I think a great amount of information concerning the administrative management of the neuroses will come out of the camp at Plattsburg. We have found a much smaller number of insane requiring hospital treatment than we anticipated.

One of the reasons of this smaller percentage is that examinations are made at the point of entrance of the recruit to the army and these have kept him from becoming a charge upon the army. The States with but few exceptions have coöperated in taking back their insane when insanity developed immediately after entrance in the army. Only about 300 men have gone back but this means that army life does affect a neurotic in a way that he will become depressed and the subject of custodial care. If he remain in civil life this will not occur. We have had less than 500 cases of drug addicts, and I doubt very much whether the drug evil is as widely distributed as we have been led to suppose. If it be proved that the number is very much above this a special camp will be established for the treatment of such patients after which they will be drilled for military service. We have now in the neuropsychiatric department about 359 officers, about one-third of whom are on the other side. They have come chiefly from the State hospitals. Neurologists are rare. It is really extraordinary to see how little neurology is studied today. The neurologists of this department are extremely few. I do not know how the number compares with that of past years, but it seems to me that something ought to be done to stimulate an interest in the study of neurology. We are asked to send men with such training and we have none to send. Last month we were obliged to decline 100 applications for positions to be filled. Men are especially wanted who speak Italian and Spanish. If any one present knows psychiatrists with these linguistic accomplishments it will be a great favor if you will give us their names or influence them to enter the service. (Exhibition of Lantern Slides.)

# NEUROSURGICAL LESSONS OF THE WAR[1]

By Major CHARLES BAGLEY, Jr., M.C.

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The nation, as a whole, has set to work with the determination, first, to win the war, and, second, in spite of the loss of life and property and the tremendous expenditure of money, to emerge from the present conflict with a creditable balance of constructive work.

The medical profession as a corps has been in the front rank of earnestly working people. The purpose of the profession differs in no way from that of the people as a whole—victory first, and constructive work secondly. I shall not dwell upon the medical and sanitary accomplishments, but invite your attention to the surgical attainments based largely upon the experience of our Allies who have been in the struggle for a long period. It is perhaps unsafe to state that new surgical principles have been established, but one may with some conservatism assert that such established teachings as drainage and wound repair have been so greatly altered and improved as to change almost entirely our previous conception of the principles. If one were asked to give in a few words the recent accomplishment of the medical profession which is of greatest value to the soldier, in my opinion he would safely say, wound excision and wound antisepsis. These few words indicate a great lowering of death-rate, absence of extreme sepsis, short convalescence, and a minimum loss of function. As a result of this marked improvement has been made in fields which previously were invaded without fear though with unsatis-

[1] Read June 5, 1918.

factory results, the best example of which may be mentioned: the great saving of extremities. But, in addition, the surgeon is now bold and sure in undertaking what was formerly considered very treacherous surgery. In this connection, I think the most striking example is the advance made in surgery of the lungs. The published reports of Piery, Duval and others, with such results as 100 per cent. of recovery in twenty-five patients with simple puncturing wounds of the lungs, or 80 per cent. recovery in 3450 cases operated on by thirty-seven surgeons and collected by Duval, clinch beyond doubt our ideas of advance in lung surgery.

In undertaking a study of the lessons of neurosurgery, one's mind naturally turns to the mother branch of general surgery. General surgery has not only made wonderful advances during the period of the present war, but had attained such results in the few years prior as to make those of us interested in the limited surgical specialties gaze with pride and perhaps envy, in the hope of keeping abreast with its progress.

In considering the neurosurgical lessons of the present war, we must admit that most of the lessons are still unlearned. When the Section of Brain Surgery was established in the Surgeon-General's Office, in July, 1917, the first lesson which was given us to learn was that of the very limited number of surgeons interested in the work. It would seem that this may account for the limited advance which brain surgery has made during the period of rapid progress of general surgery. If one glances over the contributions to this special branch, he is surprised to find that the period of interest is comparatively recent, the number of contributions small, and the number of authors of neurosurgical subjects few. Contrast for a moment the number of brilliant surgeons interested in general surgery for the past quarter of a century with the number of the same type interested during the same period in this special branch. In studying this lesson, one naturally asks for an explanation of the shortage. This, I think, may be found in the fact that a neurosurgeon must be a neurologist as well. The professional life of a physician is about long enough to permit him

to master one branch of medicine or surgery, but few men find sufficient time and continued interest to master a branch of medicine and a branch of surgery and combine the two in practice. To overcome this difficulty, the Section of Brain Surgery decided to give to a limited number of surgeons neurological instruction with a view to combining this with their previous surgical training, and, later, instruction in military surgery at the front after the completion of the fundamental work. I will not trouble you with the details of the instruction as carried on in the neurosurgical schools in this country, under the direction of Majors Frazier and Lewis and Doctors Sachs and Elsberg, since this has been done by Major Frazier in a paper presented to the American Neurological Association at Atlantic City a few weeks ago.

After providing for a staff to undertake the handling of cases, the various lessons of the actual work must be studied and thoroughly learned. First, the most important of these, is *infection*. As in other branches of surgery, this has been the greatest of barriers in the forward movement of neurosurgery. To learn this lesson will require much patience and carefully directed, laborious investigation. It must be admitted that until the present crisis there had been but isolated attempts at combating infections of the nervous system and its covering. Localized infections or abscesses may be considered amenable to treatment, but when we estimate the percentage of recoveries in non-operative and operative cases, we are forced to acknowledge our sad limitations. Diffuse inflammations, encephalitis, meningitis, etc., usually cause the surgeon to admit defeat as soon as the diagnosis is established.

The solving of the problem of infection of the central nervous system will, no doubt, furnish labor for the medical departments of armies of future generations, but it is hoped that some of the fundamental principles may be established during the present war. To this end, the Army Neurosurgical Laboratory was established under the direction of Captain Lewis H. Weed, in September, 1917. The professional staff of the laboratory includes anatomists, chemists, bacteriologists and physiologists who are making a concerted effort to determine (1) the reactions

of the nervous system to infections; (2) the process of wound healing in the nervous system; and (3) methods of combating infection and facilitating wound healing.

It is hoped that the laboratory will furnish a working basis for clinical guidance in the war zone.

Increased intracranial pressure, a problem much studied in the past, as a whole will claim less consideration during the war, but there is still much to be hoped for in the relief of very acute increase of pressure. In the classification of Fractures of Base of Skull, Ransohoff and others place a large portion of the cases under the heading, "Fatal Within the First Twenty-four Hours," which is an admission that the surgeon is unable to tide over such patients as may be subjected suddenly to increased intracranial pressure. If, however, the condition does not terminate fatally in the first twenty-four hours, there is reasonable hope of the surgeon's assistance in the second twenty-four hours. It can well be understood that many of the gunshot injuries in war surgery will fall within the large group of "Fatal Within the First Twenty-four Hours," and we must set ourselves to work in the advanced hospitals to relieving these cases in exactly the same way that the general surgeon has undertaken with success the treatment of abdominal wounds.

Let us consider the *operative procedures.* The careful studies of the small group of surgeons engaged in the unravelling of neurosurgical problems resulted in the establishment of satisfactory operative principles for the brain tumor group of cases, and, to a less extent, the traumatic cases. It must be admitted, however, that the latter group, though larger than the tumor group, has received less detailed study. Cushing, in a recent publication, makes the following remarks: "The surgical care of wounds of modern warfare is very much of a specialty, and no matter what may have been an operator's previous experience with traumatic surgery, he finds himself ill prepared for his task." Gray, in an article published in 1916, emphasizes some points regarding the removal of pulpified brain and the establishment of proper drainage so as to avoid the accumulation of material favorable to the

growth of organisms. During the past there has been considerable fear in opening the dura, some of the English surgeons advising against this procedure unless one is reasonably sure that an incision of the dura is demanded. In the early part of the war, the turning down of a tongue-shaped osteoplastic flap was recommended in all cases where there was evidence of a lesion of any degree, since many cases with very slight or practically no superficial lesions were found to have extensive extradural, cortical or intracerebral hemorrhage. In the *British Medical Journal* of February 23, 1918 Colonel Harvey Cushing describes in some detail the operative procedure which he has found of the most service. The main features of the procedure lie, says Colonel Cushing, in:

1. The removal *en bloc* rather than piecemeal of the area of cranial penetration.

2. The detection of the in-driven bony fragments by catheter palpation of the track rather than by the exploring finger.

3. The suction method of removal of the disorganized brain, thereby cleaning the track of the so-called pulped or devitalized tissue, the retention of which, as in the case with dead tissue anywhere, favors infection.

4. The use of dichloramin-T in oils as an antiseptic which is particularly suitable for infections in the central nervous tissues.

In addition, he calls attention to the importance of routine of preoperative neurological study, stereoscopic *x*-ray, the shaving of the entire scalp, the use of local anesthesia, and tripod rather than flap incisions, foreign-body extractions with magnet, and careful closure of the wound. The removal *en bloc* may be considered one of the neurological lessons of the war, for previously one was careful not to sacrifice tissue, scalp, bone or dura, for obvious reasons, chief of which was hernia cerebri. Again, the use of dichloramin-T oils as an antiseptic is a departure from our previous mode of attack upon infection, and it is hoped that the antiseptic will be as useful in injuries of the head as it has been in injuries of other parts of the body.

*Drainage*, so important in the entire field of septic surgery, has in the past received some consideration by surgeons, but because

of the peculiar texture of cerebral tissue and constant tension, the result of physiological intracranial pressure is still far from settled, and it is hoped that the large number of septic cases will be the means of properly directing our efforts in this problem.

*Foreign-body Removal.*—The technic of removal of foreign bodies through the improved methods of *x*-ray diagnosis and the use of the giant magnet, has been much improved. The surgeon is confronted by the fact that there are usually numerous fragments, some of which may not be detected, and others found to be too deeply seated to permit removal, and still others may be of such material as to render the magnet useless. This has resulted in late secondary abscesses or fungus growths, and in many cases ultimate fatality.

*Cerebral Hernia.* In the early part of the war there was considerable trouble with hernia cerebri, but the later publications, such as the one by Colonel Cushing, just referred to, indicate that this condition is now less troublesome. In this connection it is worthy of note that this condition is now rarely seen in the tumor patient of the large neurological clinics of this country.

In a recent tour of a number of the Canadian hospitals I was much impressed by the necessity for earnest study directed toward solving each of these problems. Previous to the war, traumatic epilepsy, like many of the other problems mentioned, was in an unsatisfactory state of development; but if the cases were taken early and the cause of the cortical irritation found and removed, operative procedures were worth while. If a procedure under ordinary conditions promises a small or reasonable percentage of recovery, it is fair to believe that with more detailed study quite satisfactory results may be obtained.

From our present knowledge, operative procedures such as the removal of foreign bodies, depressed fragments of bone, blood clot or other devitalized nervous tissue, adherent scars, etc., to be of avail should be instituted within the first few weeks after the injury. Experience has shown that operative attacks upon tissue previously the seat of infection is dangerous, but this dangerous period is practically passed by the time the soldier is

returned to America, as is also the period of safety, from the standpoint of traumatic epilepsy. Plans are therefore being made to have these cases promptly referred to hospitals where qualified personnel and adequate equipment will make radical treatment possible.

The repair of skull defects in the present stage of our knowledge can be considered only fairly satisfactory, but in view of the fact that so much has been accomplished in the grafting of bones of other portions of the skeleton many fundamental principles having been established, and progress may be expected in this work. In this connection, the removal *en bloc* may be expected to furnish an increased number of bony defects of sufficient size to demand repair, for by the old flap method there was limited sacrifice of bone, many fragments almost completely detached being replaced; while the present technic of removal *en masse* sacrifices not only the loose fragments but ragged rim of bone.

*Foreign bodies* in the cerebral tissue may be taken care of for a long period of time, but certainly less well than in tissues of the body which are rich in fibrous tissue, which tissue favors the permanent encapsulation of the body. The presence of a foreign body in cerebral tissue usually results in necrosis with abscess formation if there be organisms present, or in simple cyst formation. Of the cases returned to Canada with fragments of missiles in the cerebral tissue, some found their way to the hospitals for incurables, since the location of the fragment contra-indicated operative interference. In other cases, however, successful results have been obtained through the removal of small portions of fragments from cysts.

Traumatic lesions of the spinal cord will perhaps remain one of the unsolved problems of neurosurgery. The fact underlying this sad admission is the failure of cord tissue to repair. However, a great deal has been accomplished in the past few years in the prompt removal of lesions which threaten the continuity of the cord. No doubt there has been a great deal accomplished in military surgery through prompt interference in cases where there has been an injury of the column, with pressure on the cord by fragments of bone, hemorrhage or missile.

Many of the problems of the spinal cord are inseparably linked with the work of the general and orthopedic surgeon, and, unlike the cord lesion due to neoplasm, these cases cannot be sharply defined and our problems are closely associated with those of the general and orthopedic surgeons.

In a recent article by Dr. Charles Elsberg, the classification of injuries of the spinal cord furnishes an indea of the problems of this portion of neurosurgery:

Fracture of the spine without injury of the dura.

Fracture of the spine with laceration of the dura and injury of the cord.

The presence of intradural or intramedullar bullets or splinters of bone.

Incised wounds of the cord.

The operative difficulties are not great, but on account of the slow postoperative recovery and the tedious cure, these patients are quite a burden to the surgeons and nurses, and a large percentage of them are to be found in the hospitals for curables.

Patients with injuries of the peripheral nerves form by far the most important group of the neurosurgical cases. Until the present war furnished the surgeon with a great number of peripheral nerve injuries, the entire problem of this portion of neurosurgery was much neglected. In the ordinary civil hospital a few cases a year occur, in all far too few to have stimulated serious investigation leading to the correct handling of the cases. As in other branches of neurosurgery, the exact diagnosis is difficult and often impossible.

Operative results have been and still are somewhat unreliable, since it is difficult to determine without very careful consideration the absolute indications for operative interference. This fact has resulted in the wide difference of opinion as to the advisability of operation. Tinel, in his recent valuable contributions, states that 60 per cent. of the nervous injuries recover spontaneously with proper postural-mechanical treatment, while Wilms makes exploratory operation to learn the exact condition of the nerves, and consequently operates on a very much larger percentage of the cases.

The questions of the most satisfactory operative procedure, especially in cases with large gaps, the period at which it should be undertaken and what is to be expected after operation, can be elucidated through laboratory studies carried on in connection with the clinical work.

We have reason to believe that in the next few months there will be available for clinical study a group of perhaps several hundred peripheral nerve injuries. In anticipation of this work, in February, 1918, a research laboratory under the direction of Dr. G. Carl Huber was established at the University of Michigan, Ann Arbor, Mich. There has been assigned with Dr. Huber, Majors Dean DeWitt Lewis and J. Frank Corbett and Captain Byron Stookey. In a recent communication, Dr. Huber states that the work has not progressed sufficiently to justify a full report, but that some very interesting observations have been made concerning the formation of neuromata and the bridging of large defects by various types of grafts. This laboratory will be used to correlate the work of the various clinical centers where the overseas cases will be cared for.

From what has been said, I think it is plainly evident that the Medical Department of the United States Army, confronted in the beginning of the war with a very limited personnel for the care of patients with injuries of the nervous system, has completed a program by which the soldier with a neurosurgical condition may receive skilled treatment. In addition to the proper care of the soldier, it is hoped that because of the large material and the combined efforts of all those interested in neurological problems, some real contributions will be given to this branch of surgery which will, after the war, place the work far ahead of its relatively limited field a few years ago.

# PSYCHOLOGICAL EXAMINING IN THE ARMY[1]

By Major ROBERT M. YERKES
SAN. C., N. A.

I shall speak of only one of the several aspects of psychological service in the Army, namely, the examining of drafted men and of company officers.

The principal purposes of this examining are to assist the psychiatrist and neurologist in eliminating the mentally unfit; to assist the personnel officer in classifying soldiers and to aid all officers in the selection of men who are fit for special responsibility or for training in officers' training camps.

Methods for this work were devised and developed during the summer of 1917. Since that time they have been revised repeatedly and their value greatly increased.

Approximately 300,000 men have been examined. Of these, 10,000 are officers and approximately 25,000 are students in officers' training camps. At the present moment, psychological examinations are being made in the Army at the rate of at least 50,000 a week.

At the outset it was believed that psychological examining would be of greater assistance to medical officers than to any other arm of the service. But it is now apparent that this work has even more important significance for the personnel bureau of the Army than for the Medical Department.

Examining consists (1) of a general survey made by means of group examinations, and (2) of more intensive and thoroughgoing individual examinations where their desirability is indicated.

[1] Read June 5, 1918.

The procedure is roughly as follows: A group of from 100 to 300 drafted men reports in examining room. This is promptly split into two sections, consisting respectively of men who can read and write English fairly well and of those who because of foreign birth or lack of education are illiterate in English. The literate group is then given one form of examination; the illiterate group an entirely different sort of examination, which does not require either reading or writing. A man who fails in the group examination for illiterates, that for literates, or both, is thereupon given individual examination.

Intelligence status is expressed for military purposes by the use of letter grades: the grades A, B, C−, C, C−, D and E covering the entire range of intelligence.

Several varieties of individual examination are used; they are applied in accordance with the characteristics of the individual to be examined. (Slides exhibited to indicate materials used for examinations, to show examining procedure in one of the National Army cantonments, and to present important results of examining in the Army.)

The personnel for this new work is of very high quality. More than seventy officers have been trained for work in military psychology at the school in military psychology, medical officers' training camp, Fort Oglethorpe, Georgia. These men are now conducting psychological examinations in the various Army training camps. At the same school about 250 enlisted men have been given training in military psychology.

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## DISCUSSION ON THE PAPERS OF DRS. BAILEY, BAGLEY AND YERKES

Dr. F. X. Dercum: Col. Bagley, in dealing with the question of the neuroses, would prevent men suffering from them, from getting into the ranks at all. I am quite sure that if the medical examining boards do their work faithfully, the great mass of this material will be excluded. It seems most unwise to send such men to the camps. They only crowd the hospitals,

and from the standpoint of military economics prove to be very expensive. Regarding the symptoms of the psychoneuroses met with in the army, we can group them all under the familiar clinical pictures seen in civil life. Curiously enough, they occur largely among the draftees, just as in the out-patient departments and hospital wards; they are less frequent among officers, just as they are less frequent among the better classes in civil life. They belong to a group biologically inferior. It is most important that they be excluded at the source.

So far as the psychological tests are concerned, it seems to me that a man may not be able to pass these tests and yet make a very efficient soldier. These tests are not a measure of a man's physical strength, of his endurance, of his ability to shoot, of his personal courage. Many a man has sprung from the ranks who did not have the qualities of mind enabling him to pass through such a series of complicated tests, and yet has made an efficient officer.

Dr. Thomas McCrae: If anyone who has been abroad working on the medical side in the war were asked who has the best chance of being of use, he would answer—"the neurologist." I do not believe this is sufficiently recognized. I have urged upon every man connected with the formation of a military hospital unit the necessity of having a well-qualified neurologist on the staff. A number have asked what need there is abroad for neurologists. As head of the medical side of a hospital without a neurologist, I had to meet the neurological problems arising among 2000 patients. Such problems as this were put up to me—should we operate on this man's cord or cut down on this nerve? Is a certain nerve divided or only injured? I do not think anyone realizes the difficulties presented. The ordinary rules of diagnosis simply go by the board. Many cases of nerve injury are extremely complicated and the decision as to treatment is often a difficult matter. My feeling as regards interference is that it is better to err on the conservative side. I should like to emphasize the need in this war for the neurologist.

# EXPERIMENTAL STUDIES IN IMMUNIZATION AGAINST PNEUMOCOCCAL INFECTION, WITH A NEW METHOD FOR MEASURING THE EXTENT OF THE IMMUNITY [1]

By SOLOMON SOLIS-COHEN, M.D.

AND

GEORGE D. HEIST, M.D.

(By Invitation)

(From the Jules E. Mastbaum Laboratory of the Jewish Hospital of Philadelphia)
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The desirability of perfecting a test that will gauge the response of an animal to inoculations of pneumococcal vaccine more accurately than any of those at present in use cannot be denied. After the injection of an animal or man with dead pneumococci, or after the recovery of a man from lobar pneumonia, the conclusion arrived at is that the blood contains immune bodies; but the means by which such a judgment is reached admit of improvement. The agglutination test is, until now, by general consent the best; as the time, labor and expense required for the performance of the mouse-protection test virtually rules it out.

The serum of an animal that has been given repeated and massive doses of pneumococci usually agglutinates strongly; but the testing of these highly immune serums, used for serum-therapy and type-determination, is a restricted application for a test which shall serve as an index of immunity. To be most useful, a test must show clearly and measure accurately slight degrees of immunity

[1] Read October 2, 1918.

to pneumococcus infection, such as can be produced in experimental animals or men by doses of vaccine which are small enough to be free from danger not only, but from discomfort as well.

Agglutination does not meet this need. Let us give two illustrations from recent literature: Lister[1] says: "Rabbit No. 22 which had received three doses of only 50,000,000 cocci failed both to agglutinate and opsonise strain 737 and gave but a trace of agglutination and a relatively small degree of phagocytosis with strain 3472; despite these facts the animal survived its test dose."

Cecil and Austin,[2] when experimenting to determine the optimal dosage of pneumococcal vaccine for men, injected forty-four individuals with varying numbers of pneumococci and then tested their blood for agglutinating and mouse-protecting substances. Each man received Type III pneumococci along with Types I and II. In no case did they find a serum that would agglutinate Type III organisms, and yet they conclude, and with most excellent reason, that injections of Type III are of value.

Our work during the past year has aimed at discovering some simple test more sensitive than agglutination.

As a starting-point for our investigations we compared the pigeon, which is highly immune to pneumococcal infection, with the rabbit and mouse, which are extremely susceptible. Much effort has been directed toward ascertaining why the pigeon is immune to pneumococcal infection; but it has hitherto met with little success. One writer[3] thought the high body temperature of fowls to be the essential factor. Another writer, Kyes,[4] demonstrated that the injected pneumococci are ingested and destroyed by fixed cells in the spleen of the pigeon, but admits that other factors as well, are probably concerned. All investigation to date has failed to reveal any difference between the action upon pneumococci of the serum of the immune pigeon and the serum of the susceptible rabbit.

We were directed to a consideration of the whole, uncoagulated blood as it flows from the capillaries, by Wright.[5] In his South African work on pneumonia, Wright observed that blood freshly drawn from the body, and before coagulation, has a bactericidal

action upon pneumococci not possessed by serum or defibrinated blood. We wish to emphasize that it is the *flowing blood* to which we refer when we speak of "whole blood." When one works with flowing blood all manipulations must be completed in the few minutes that elapse between the time the blood starts to flow and the moment of coagulation.

Wright did not attempt to make the testing of this bactericidal power of whole blood a practical method of investigation. We are indebted to Benjamin F. Lacy for suggestions which have made it possible for us to study the phenomenon.

Professor Lacy indicated that surface tension might be a factor in immunity to the pneumococcus, and he further pointed out how surface tension might be utilized in the study of uncoagulated blood.

Our method is this: When one end of a capillary glass tube is touched to the surface of a broth culture, or dilution of a broth culture of pneumococci, the fluid flows up the tube by capillary attraction and remains there after the tip of the tube is withdrawn from the fluid. If the tip is then touched to moist cheesecloth the greater adhesion of the cloth for the fluid causes it to flow out of the tube, leaving a certain number of pneumococci sticking to the glass. The tip of this capillary tube, seeded with pneumococci, is now introduced into a drop of blood obtained by pricking the finger of a man, or the ear-vein of a rabbit, or the vein of a pigeon, as the case may be. The blood flows up the tube and covers the pneumococci on the wall. In due time it clots in the tube. The tip of the tube is sealed and the tube incubated for twenty-four hours. At the end of that time the tip is broken off and a smear made from the contained blood.

When the blood of a mouse or rabbit is compared by this method with the blood of a pigeon, striking differences are observed. In the tube filled with mouse or rabbit blood the pneumococci have grown abundantly; in the tube containing pigeon's blood they have failed to grow. That the action of the pigeon's blood is bactericidal and not merely inhibitory to the growth of pneumococci may be shown by blowing out the contents of the

tube, after incubation, into a test-tube of broth. No growth results.

This, we believe, is the first biological difference demonstrated between the body fluids of naturally immune and susceptible species with respect to the pneumococcus.

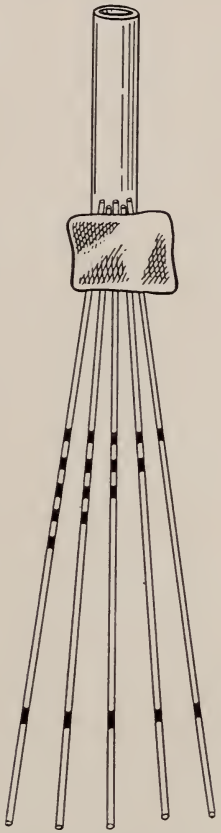

FIG. 1.—Modification of Wright's many-stemmed pipette used in estimating the bactericidal power of whole blood.

To measure this bactericidal power we made use of serial dilutions of our cultures by means of a modification of Wright's many-stemmed pipette, which he uses for estimating the coagulation time of blood (Figs. 1 and 2).

Feeling convinced that the bactericidal power of whole blood was worth study and having a method of measuring it, we have

Fig. 2.—Method of filling many-stemmed pipette with human blood for the estimation of its bactericidal power and the apparatus required for the test.

tried to work out its practical application to the pneumococcus problem. We have been much encouraged by the findings of

Kolmer and Matsunami. Using our method, they showed that the natural immunity of the rabbit to meningococcal infection and the susceptibility of the mouse to the same organism could be demonstrated *in vitro*. Our work has been largely directed to finding the possibilities and limitations of this test.

We soon found that not only the natural immunity but that induced by inoculations could be measured by testing the bactericidal power of whole blood; and that the virulence of the strain used is of utmost importance in the test. When testing whole blood it was observed that no contaminations by saprophytic bacteria occurred. Some experiments were made to explain this. It was found that if small numbers of strictly non-pathogenic bacteria, such as B. subtilis, were seeded in whole blood they failed to grow.

The bacillus of mouse typhoid, a common and annoying organism met with in experiments upon mice, is extremely virulent for both mice and rabbits. It grows very well in the blood of both species. A 1 to 1,000,000 dilution of a broth culture of B. murium typhi contains sufficient organisms to cause growth in capillary tubes of rabbit blood.

Strains of avirulent pneumococci failed to grow in the blood of normal rabbits unless the tubes were seeded from suspensions which contained large numbers of pneumococci. Strains of high virulence grew in the blood of the same rabbits even when very few pneumococci were seeded. To express this differently, the blood of normal rabbits is able to kill large numbers of pneumococci that have lost their virulence through long cultivation upon artificial media, but it is powerless to kill virulent pneumococci.

Here, then, we have a method by which we may test the virulence of any strain of pneumococci without risking the life of the experimental animal. It seems a safe analogy to say that if a strain of pneumococci grows well in human blood it is virulent for human beings, and that a strain which does not grow well in human blood is not virulent for human beings.

The bactericidal action of the whole blood of a rabbit suitably immunized with dead pneumococci is specific as regards type. A rabbit was injected intravenously with a total of 60,000,000

Type I pneumococci. The blood of this rabbit acquired the power of destroying Type I pneumococci but not Types II or III. Dr. Kolmer permitted us to test this rabbit, which had been inoculated in his laboratory. Since that time the experiment has been often repeated and upon many animals, and upon men who have recovered from lobar pneumonia. The type specificity seems indisputable. That a high degree of immunity for one type is accompanied by a slight resistance to one or more of the other types is suggested by the results of certain experiments, but has yet to be thoroughly confirmed.

It is somewhat hard to understand how the natural immunity of the pigeon for all types of pneumococci and the immunity of the inoculated rabbit for only the type with which it was inoculated can be due to the same biological force. It must be remembered that when whole blood is tested, many immune bodies, such as opsonins, agglutinins, bactericidins, or others of which we know nothing, have the opportunity to come into play. The natural immunity of fowls to pneumococcal infection may be due to some biological force with which we are not familiar, while the immunity of the immunized rabbit may be due to phagocytosis. This test by no means proves the identity of natural and artificial immunity.

The original experiment in which 60,000,000 pneumococci given intravenously induced a strong bactericidal action in the blood of the rabbit illustrates the sensitiveness of the test. The serum of this rabbit showed the merest trace of agglutination even when agglutination was searched for with the microscope.

As bactericidal action could be readily demonstrated in rabbits' blood after intravenous administration of such small doses of vaccine, when only a trace of agglutination could be found in the same blood, we hoped that subcutaneous inoculations might produce bactericidal action even when no agglutination could be found. We did not find this to be the case. We injected a series of rabbits, subcutaneously, with small and large doses of a vaccine prepared from pneumococci grown in broth. We failed to produce more than a very slight bactericidal action in their blood. One rabbit received 18 billion organisms, divided into four weekly

doses. When these rabbits were subsequently injected with lethal doses of living pneumococci they died. It may have been that the samples of vaccine used lacked antigenic qualities, or the test doses of living organisms may have been too large to bring out any slight immunity present. Lipovaccine, in which the cocci are suspended in oil instead of in salt solution, likewise did not induce bactericidal action in the blood, nor immunity. These experiments lend confirmation to our hypothesis that immunity, shown by the animal's resistance to lethal doses, is correlated with the presence of bactericidal substances in the circulating blood which may be demonstrated *in vitro*.

Our failure to produce immune bodies in rabbits by subcutaneous inoculations must not be interpreted to mean that immune bodies cannot be produced in men by subcutaneous inoculations. Let us quote Lister upon this point. He says: "The rabbit and the man do not respond similarly to injections of the same pneumococcal vaccine. The subcutaneous administration, to a man, at appropriate intervals, of three . . doses of . . . vaccine . . . will result . . . in satisfactory antibody production. Smaller doses of the same vaccine will be equally successful if administered intravenously. A rabbit can, however, be inoculated with doses of exactly the same size of the same vaccine, either subcutaneously or intravenously, and yet no appearance of agglutinins or increase of opsonins will become apparent."

When we have referred to pneumococcal vaccine we have meant vaccine made from pneumococci which had been grown on artificial media — either in broth or upon agar. Pneumococcal vaccines so prepared are often lacking in antigenic properties. We have seen that the subcutaneous administration of such vaccines, in rabbits at least, is not followed by the appearance of much immunity. In man they are more effective as shown by the results obtained by Cecil and Austin.

Before the work of Cecil and Austin appeared we tried to produce a vaccine which would be more active than that made from pneumococci grown upon artificial media. When a rabbit is injected intraperitoneally with virulent pneumococci the organ-

isms multiply in the peritoneal cavity and before the death of the animal they are present in great numbers in the peritoneal exudate. We secured these pneumococci by washing out the peritoneal cavity with salt solution. We obtained 50 c.c. of a heavy suspension of pneumococci. This was freed of cells by centrifuging at low speed and a vaccine prepared from the supernatant fluid. The organisms were killed by heating and counted in the usual way. This vaccine possessed antigenic properties lacking in that prepared from pneumococci grown upon artificial media—in fact, it was quite ideal. Very small doses given to rabbits subcutaneously were followed by the rapid appearance of bactericidal properties in their blood and agglutinins in their serum, and the animals survived lethal doses of living pneumococci. The preparation of a vaccine of this type on a large scale would be difficult and after we found that Cecil and Austin had achieved such excellent results we ceased to experiment further with it. Such a vaccine may be found to be of use in preparing potent antiserums for Types II and III.

This brief sketch of the results of our work at the Jewish Hospital will serve to bring out the following facts:

The whole blood of an immune animal possesses bactericidal power for pneumococci which is not possessed by serum or defibrinated blood.

This bactericidal power may be induced in a susceptible animal by suitable inoculations. The induced bactericidal power is specific as regards type of pneumococci.

The technic of measuring this power is simple and all the apparatus required may be found in any laboratory. A virulent strain of pneumococci must be used for the test and the more virulent the strain the more clear-cut will be the results.

The test is more sensitive than the agglutination test.

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## DISCUSSION

Major Austin: The question of finding some simple test for immunity against the pneumococcus is one of the things we have been most anxious to obtain. At present the only one sufficiently delicate to be of value is the mouse-protection test. As Dr. Heist has said, this is very difficult to carry out and is not practical on a large scale. The reliability of the quantitative features of Dr. Heist's test would seem to me to require further substantiation or refinement. Simply as a qualitative test, however, of the protective power of the whole blood it might well be of value. In our search for a sufficiently delicate and at the same time simple test this seems to offer promising possibilities.

Dr. Heist (closing): Regarding the quantitative action of this test. It certainly would appear that it would not have any great qualitative value if we get so many pneumococci in a tube one day and a different number in a corresponding tube another day. To overcome this we have used the same type of media each day and in making our dilutions of blood-broth culture we have used rather large steps—one to five and one to twenty-five; multiples of five or of ten; thereby hoping to avoid differences in the number of pneumococci in the tubes at different times. The best test of its accuracy is the way it works out. One advantage of the test is that there is no difficulty in finding the end-point. The pneumococci either grow or they do not grow.

Dr. Solis-Cohen (closing): It is true that quantitatively our serial dilutions give approximate measurements only. Yet as the difference between two tumors may be expressed with sufficient closeness for

practical purposes by saying that one is "the size of a hen's egg" and the other "the size of an orange," the differences among our serial dilutions are sufficiently remote to give a good general idea of the relative germicidal result. But the great value of what I wish to term the *Lacy-Heist method* of determining immunity is qualitative. It permits one to say positively, and without the delay and uncertainties of statistical observations, whether a man or animal is or is not naturally immune to a given infection, and whether a particular method of immunization has or has not been effective. Its accuracy has been proved not only as to pneumococcal, but also as to meningococcal and poliomyelitic infection, and Dr. Heist and I invite—nay, plead for—its critical trying-out on the largest possible scale not only with all forms of infection in the laboratory but also as a test of immunity in man, after bacterination or other prophylactic and therapeutic measures. We believe that it has a wide field of possible usefulness.

# JEAN PAUL MARAT, PHYSICIAN, REVOLUTIONIST, PARANOIAC[1]

By CHARLES W. BURR, M.D.

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Jean Paul Mara, the final "t" was added later, was born on May 24, 1743, in the village of Boudry, now in the Swiss canton of Neuchatel, but then a fief of the Prussian crown. His racial stock, what human breeds intermixed to make him, is unknown. His father, about whom little is known, migrated from Sardinia, and during his life worked at several occupations, being in turn a chemist, a designer and a teacher of languages. His mother, of whom also little is known, had a French father. One of her neighbors evidently had a very bad opinion of her, because when the Marats moved to Geneva she sent after them an anonymous letter accusing Mrs. Marat of possessing a diabolical tongue, being a most notorious liar, a woman of no character and having a husband who was a downright hypocrite and a canting humbug. The letter throws more light on the character of the writer than on that of Mrs. Marat, who was far from deserving such a castigation, while her accuser was, in theological language, possessed by a devil, or, in scientific language, so poisoned by the toxins of anger that reason abdicated and uncurbed emotion ruled.

We possess little data as to Marat's family inheritance, and in consequence are ignorant of the real causes of his being the man he was. We also know but little of the environmental influences to which he was subjected in childhood and in youth. In later life he gave in the *Journal de la Republic Française* the following, almost wholly subjective, autobiographical account, which is to

[1] Read November 5, 1918.

be taken with several grains, indeed many bushels, of salt. He writes: "Born with an impressionable nature, a fiery imagination, a hot, frank and tenacious temperament, an upright mind, a heart open to every lofty passion and above all to the love of fame, I have never done anything to pervert or destroy these gifts of nature, but have done everything to cultivate them.

"By an exceptional good fortune I have had the advantages of receiving a careful education in my father's house, of escaping all the vicious habits of childhood that enervate and degrade a man, of avoiding all the excesses of youth and of arriving at manhood without having abandoned myself to the whirlwind of the passions. I was pure at the age of twenty-one, and had already for a long time past been given to the meditation of the study. The only passion that devoured my mind was the love of fame; but as yet it was only a fire smouldering under the ashes. The stamp of my mind had been impressed upon me by nature, but it is to my mother that I owe the development of my character. This good woman, whose loss I still deplore, trained my early years; she alone caused benevolence to expand in my heart. It was through my hands that she caused the succor that she gave to the indigent to pass, and the tone of interest she displayed in speaking with them inspired me with her own feelings.

"Upon the love of humanity is based the love of justice, for the notion of what is just comes from sentiment as much as from reason. My moral sense was already developed at the age of eight. Even then I could not bear to behold ill-treatment practised upon another; the sight of cruelty filled me with indignation, and an injustice always made my blood boil with a feeling as of a personal outrage.

"During my early years my constitution was very delicate; moreover, I never knew either petulence or obstinancy or the games of childhood. Docile and diligent, my masters obtained everything from me by gentleness. I was only chastised once, and the resentment at an unjust humiliation made such an impression upon me that it was found impossible to bring me again under my instructor's authority. I remained two whole days without taking

nourishment. I was then eleven years old, and the strength of my character may be estimated from this single trait. My parents not having been able to bend me, and the paternal authority believing itself compromised, I was locked up in a room; unable to resist the indignation that choked me, I opened the casement and flung myself into the street; happily the casement was not high, but I did not fail to hurt myself seriously in the fall, and bear the mark on my forehead to this day.

"The shallow men who reproach me with being a 'tete' (obstinate fellow) will see from this that I was such at an early age; but they will refuse perhaps to believe that at this time of life I was devoured by the love of fame; a passion that has often changed its object at different periods of my life, but which has never quitted me for a moment. At five years of age I wanted to be a schoolmaster; at fifteen a professor; at eighteen an author; and at twenty a creative genius. This is what nature and the lessons of my childhood have made me. Circumstances and reflections have done the rest. I was reflective at fifteen, a thinker at twenty-one. At the age of ten I contracted the habit of a studious life; mental work had become a veritable necessity for me, even in illness, and my greatest pleasures I have found in meditation." He paints himself as perfect, a satisfied self-worshipper.

Almost no man, and certainly no one of histrionic temperament, ever writes of the psychical experiences of his boyhood truthfully; he looks back at them through the mist of illusions of memory, is a victim of paramnesia, remembers things that never happened, because he has the will to believe in their reality, credits ideas, opinions and emotions of his adult life to an earlier time. I doubt not, Marat described his early mental life, his psychical development, as he believed it to have been, but he so believed because he wanted such a boyhood; he was, to himself, his image of a hero, and as such he paints himself, but to the psychiatrist what he wrote is valuable, because it reveals his nature all unconsciously to himself—the vanity of the man, his self-centeredness, his feeling of being persecuted, his femininenes in mistaking feeling for thought, mistaking intuition, which is really emotional guessing,

for ratiocination, and his worship of words. His writings so accurately portray his mental makeup, his temperament and character that I have, at the risk of being almost unbearably boresome, quoted quite extensively from them. In drawing conclusions from them, however, we of British inheritance must remember that in France, especially during the revolutionary period, it was quite the proper thing not to be restrained, reserved, in talking or writing about one's self but to take, or pretend to take, the hearer or reader to one's bosom. He may have been precocious, he probably was, but precocity means premature rotting as well as apparent premature ripening. Normal men do not believe that their moral sense was "developed at the age of eight," and do not boast of having thrown themselves out of windows at eleven because their parents punished them. Healthy children are not devoured by the love of fame.

Whatever Marat's heredity may have been, his parents were kind and realized the value of education. Whether his home environment was of the wisest we do not know, but in childhood and youth he certainly escaped the interference with his mental growth which many fear the American boy of the twentieth century will not escape. Outside the home, conditions probably were commonplace. At about his seventeenth year he left home to seek university learning, apparently with the definite idea of becoming a physician, and this proves he had qualities far above the average youth, but, like many another paranoiac in the making, he worshipped the tongue in action and measured professorial wisdom by the rapidity of the flow of words from the professorial mouth. He studied at Toulouse, Bordeaux, Paris, Holland, London. About 1765 he started to practice medicine in Church Street, London, and remained there about twelve years. It is unknown when and where he got his first degree in medicine, but in 1775 he was granted a kind of honorary degree of Doctor of Medicine by the University of St. Andrew at the request of two physicians, Dr. Hugh James and Dr. William Buchan. It was not unusual to confer such a degree at that time, and the granting of it carried no connotation of distinction or eminence.

While in London he wrote much on scientific and philosophic subjects. His first work was *An Essay on the Human Soul*, which he later expanded into *A Philosophical Essay on Man, on the Principles and the Laws of the Influence of the Soul on the Body and the Body on the Soul*. Such books appeal to minds of a certain type and continue to be published, even in this day of self-alleged greater knowledge and wisdom. Another book was *The Discoveries of M. Marat on Fire, Electricity and Light*, which received honorable mention and approbation from the French Academy. He published during the same period pamphlets on a *Singular Disease of the Eyes* and *An Essay on Gleets*, both of which are wholly sane in manner and matter, but are not remarkable except for his boastful claim of ability to cure any case of gleet. Since, however, some physicians of our own day do not hesitate to admit the same belief in their infallibility without being accused of being mentally abnormal, we must not hastily draw conclusions about him.

The following extract from his philosophical essay is of interest as showing his scholastic viewpoint. He, quite naturally, considering the age in which he lived, accepts as correct the division of man into soul and body and, searching for the dwelling place of the soul, concludes without, however, having first defined what the soul is:

"Anatomists agree that we must look for the seat of the soul in the head; but they are not unanimous as to what place it occupies in that part of the body. Some place it in the pineal gland, others in the corpus callosum, others again in the cerebrum; some in the cerebellum and some in the meninges. But of these different opinions the last one is well founded, for if we trace the nerves to their entrance into the membranes of the brain we shall find they confound themselves with the meninges and form one simple uniform substance with them.

"Hence, if the nerves only are sensible and if the sensations are not continued to the soul by these organs we plainly perceive that the meninges must be esteemed the seat of the soul. For as the membranes and their productions are the general organs of

sensation of the body, its seat must be in that part where the concourse appears, viz., at the center of all the organs of sensation: these membranes are this center.

"Experience likewise daily confirms it: the slightest inflammation of the meninges occasions a delirium and a temporary insanity. The irritation of the nerves, by the fumes of wine from drinking to excess, or by the fumes of tobacco, is followed by the irritation of the meninges, and the loss of reason; this never happens to any other part of the head.

"The substance of the cerebrum or cerebellum may be taken from a living animal without the soul's being instantly affected; and though the wounds of the center of the brain, of the pineal gland and of the corpus callosum sometimes injure the functions of the soul, it is not because the seat of the mind is in either of these parts; but because these parts secrete a fluid which is necessary to its operations, and by reason of the irritation which wounds in these parts communicate to the meninges. In these membranes Eternal Wisdom has placed the soul, and united it to our organs by imperceptible bands; here it has fixed the seat of thought, of memory, and of will."

The following, written years before he became a leader of the mob, is of interest when one considers his own conduct in his later life. "Such as are brought up in an excess of delicacy, and a continual habit of indulging themselves in every sort of pleasure, are not affected by the sufferings of others: their sensibility is constantly employed on themselves; they are altogether unconcerned about other beings; and their hearts are steeled against the sufferings of mankind. In proportion as this love of self increases, pity decays, and frequently becomes extinct. He who melts into tears at the distress of the unfortunate, were he his enemy, instead of alleviating would aggravate his misfortune.

"Nero, who wished he had never learned to write when pressed to sign the warrant for a criminal's execution, could delight in the murder of his enemies. This tyrant, who loudly bewailed the fate of Andromache as presented on the stage, could hear without emotion the cries of those he had doomed to destruction.

"Pity is destroyed by the passions; it is even generated in the heart only by prudent reflection, is nourished only by tender sentiments, and is wholly extinguished by the frequency of those objects which ought naturally to confirm it. Let us suppose a man has never heard any one discourse on ideas of justice, goodness, clemency and generosity; he must remain forever ignorant of the very names of those virtues.

"By a frequent attendance at those bloody feasts, which in some great cities are given by avarice to idleness, you will soon lose all sense of the strong emotions you had hitherto felt at the cries of the mangled animals; in time you will hear them with pleasure, and wait impatiently for a repetition of them. By frequenting such scenes, the soul becomes callous to impressions; is unaffected with the prospect of human miseries, and insensible to every tender emotion.

"Do not these reasons prove that pity is not a native of the human breast?"

Voltaire, who certainly had a clear head and much learning as well as a caustic wit, did not hold Marat in high esteem as an explainer of the universe. In one place, Marat, giving himself up unrestrainedly, as he had a habit of doing, to the enjoyment of fine writing, *i. e.*, writing which is sonorous but meaningless, refers rather emphatically to thought making a man enjoy nothingness. Voltaire comments: "It" (nothingness) "is a great empire; reign there, but insult a little less those who are something." Marat said, Voltaire's contemptuous attitude was caused by grief at seeing himself put in his proper place in the *Essay on Man.* This little incident is an example of how small a thing may throw a bright light on a man's nature. Marat believed he had a much greater intellect than Voltaire.

His first political book, entitled *Chains of Slavery,* "a work wherein the clandestine and villainous attempts of princes to ruin liberty are pointed out and the dreadful scenes of despotism disclosed," was published in 1774. Its purpose was "to secure the triumph of liberty in England, to paint the inestimable advantages of liberty, the frightful evils of despotism." The title, which is too

long to quote in full, is suggestive to the psychiatrist, because political paranoiacs of the book-writing class are prone to long descriptive titles and revel in the words despotism, villainy, liberty, tyranny and such phrases as "the people's friend," "the wickedness of kings," "the sinfulness of the rich," and the like. Every collection of such books shows a family likeness in all the title pages. In describing the making of the book he says, and I quote him verbatim, he devoured thirty volumes, worked twenty-one hours a day for three months, and kept himself going by drinking excessive quantities of coffee. Like many of the writers and teachers of the newer sociology of today, he imagined that all that is necessary to become an expert on any subject is to read some books, take pen, and let the ink flow. Such men lack the ability to meditate, they do not know what it means: it is outside their world. Immediately on completion of the book he fell ill, became stuporous, dazed, lost all power of memory, was miserably weak physically. He recovered in thirteen days "by aid of music and repose." It is noteworthy, in the psychology of authorship, that men who make great fundamental discoveries in science, or, by their writings on political matters, help this poor old world along to wherever it may be going, are not broken by their labors and never become hysterical or histrionic, while the gentlemen who continuously in print or on the platform protest their love of the people, without ever in any way helping us by good deeds are very prone to hysterical disorders. We have had illustrations of this in our recent political history, in men who have bulked momentarily large in the public eye. The explanation is simple: such men overwork their emotions and think they are overworking intellect (they are feeling not thinking animals) while real thinkers are not troubled by unruly emotions concerning the things they write about and have other outlets for their emotions.

Light is thrown on Marat's mental nature by his description of his troubles, many of them largely imagined but all having a foundation of fact, in getting *The Chains of Slavery* printed. The book was written to show the wickedness of Lord North and his administration of the British government. It never entered Marat's

head, being convinced he was a savior whose mission was to free unconscious slaves, that the English people might regard it as an impertinence, if indeed the mass of them thought of the matter at all, for an unknown and rather ignorant foreigner to attempt to advise them how they should govern their country. He was astonished that when he offered the book to the printers, no one cared to publish it: several gave no reason, but one, Woodfall, suggested that the introduction was of a nature to give offense in powerful quarters. This explained matters to Marat; the printer, he was convinced, was bought up. The fact that the Prince of Wales's bookseller wished his name struck off the list of subscribers strengthened his belief in a conspiracy. Marat tells us he "became heroic." He slept for six weeks with a brace of pistols under his pillow, in order that he might receive in proper fashion any minion of the state who might be sent to seize his papers. Notwithstanding his preparations nothing happened and he concluded that the British government, having learned of his determination to protect his papers even by gunfire, had decided to use cunning instead of brute force. Finding publication in the ordinary way impossible, he decided to send copies to the so-called Patriotic societies in the north of England. But, as he believed, Lord North heard of this, surrounded him with spies, tried to corrupt his servants and his landlord, intercepted his family letters, and indeed used the whole governmental machinery, to stop the circulation of the book. Marat now determined to put the government off its guard by disappearing. He accordingly went to Holland and immediately returned to the north of England, where he visited all the patriotic societies, this bit of childish cunning being, in his opinion, enough to mystify all the English spies and detectives. All of the societies gave him the civic crown and one even insisted in contributing to the cost of printing the book which Marat believed the British Government had spent eight thousand guineas in suppressing. The only comment one can make is, that though Lord North may not have been, indeed was not, the wisest of men, and certainly was more than unfriendly to Marat, he was not the sort of man to value Marat at any such price. He

may have spent eight thousand shillings of the taxpayers' money in the suppression of free speech by Marat, but it is doubtful. If he did he wasted money.

In 1777 an incongruous event happened in the life of him who was to be self-dubbed "the people's friend." He became physician to the Garde du Corps in the Comte d'Artois's household. Writers who do not approve of him state incorrectly, and rather maliciously, that his real position in the household was that of a horse doctor. Having obtained the position, he desired to prove his own right of nobility, feeling he properly belonged to the same class whose company he was keeping, and he wrote to the chief of the heraldry office about the matter. The hater of despotism and the believer in the equality of men took service under an aristocrat of the first water and wanted the bauble of nobility himself. He doubtless held with Emerson, before Emerson was born, that consistency is the bugbear of little minds. He retained this position until 1786. Meanwhile he wrote much on scientific subjects—on light, fire, electricity, optics. None of these writings are remarkable and they did not aid the progress of science in any way. He did, however, at that time have a real desire for knowledge. His scientific and medical writings were not a pose, but were honestly written by a man interested, and somewhat trained, in scientific matters. His own opinion of his position in the world of science is revealed by him in the following quotation: "Calumny has flown from Paris to the Escurial to blacken me in the mind of a great king and an illustrious Maecenas. Who are my detractors? Envious cowards, the numerous crowd of whom does not cease to devote itself to my destruction—modern philosophers, hidden under anonymity or false names in order to defame me. Scarcely had I attained the age of eighteen, when our pretended philosophers made various attempts to drag me into their party." He was sure one of his books was prohibited in France because certain French philosophers were envious of him. What he thought of himself as a physician the following quotations will show: "Many sick persons," he says, "of distinguished rank, who were despaired of by their physicians, and to whom I had restored health, joined

with my friends in endeavoring to induce me to fix my abode in the capital. I acceded to their persuasions; they promised me fortune, I have only found outrage, annoyance, and trouble."

He continues: "The fame of the surprising cures I have made drew to me a prodigious crowd of sick people; my door was continually assailed by the carriages of persons who came to consult me from every quarter. As I exercised my art as a physician, the knowledge of Nature gave me great advantage, no less than my swiftness of eye and accuracy of touch, and my multiplied successes caused me to be called 'the physician of the incurable.' . . . My successes gave umbrage to the doctors of the Faculty, who calculated with sorrow the big amount of my profits." (I may say in parenthesis he never made any money, never tried to, was careless about money, financially honest, and died almost penniless.) "They consoled themselves by forming a project to dry up their source. I could prove, if needs be, that they held frequent meetings to consider the most efficacious means of slandering me. Henceforth calumny spread in every direction, and anonymous letters reached my patients from all sides in order to alarm them with regard to me. A large number of persons, whose friendship for me is founded on esteem, took up my defence, it is true; but their voices were drowned by the clamor of my opponents. All these facts are matters of public notoriety.

"Disgust, inseparable from the practice of medicine, made me sigh more than once for the retirement of the library; I then gave myself up entirely to my favorite studies. Could I have foreseen that I was to make for myself a new cause for envy?"

His opinion of himself as a statesman and a partial catalogue of his acts is shown in the following quotation:

"All that a man of sense and a man of heart could do to save his country I have done to defend mine. Alone and without support, I have fought for two whole years against the commissioners of sections, the municipal administrators, the chiefs of police, the courts of justice, the tribunal of state, the government, the prince, the National Assembly itself, and often with success. I have exposed the black designs of the court, detected its snares, its

artifices, its plots; I have disconcerted the conspirators, prepared the fall of Le Chatelet and brought about that of an adored minister. I have unmasked the Parisian general, raised the army and the fleet against their despotic chiefs; more than once I have compelled venal committees to resign, to suspend or to revise their projected decrees; I have struggled against oppressors of every kind; I have rescued a hundred thousand victims from judicial tyranny. More than once I have made the tyrant on his throne turn pale, and dismiss his frightful agents. Always in arms against the traitors to the fatherland, indignant at their crimes, and shocked at their atrocities, I have torn away their masks, I have made a spectacle of them, their impostures, their defamations; I have braved their resentment, their fury. Exposed to their wrath, I have been pursued again and again by the ministers and the municipal administrators. Twenty military expeditions directed against me, and a whole army mobilized to tear me away from the people, have only increased my audacity. A price has been put on my head; five cruel spies put on my tracks, and two thousand assassins paid to slay me, have not for an instant succeeded in making me betray my duty.

"To escape the steel of the assassins, I have been obliged to betake myself to a subterranean life; hunted out from time to time by battalions of alguazils, compelled to flee, wandering through the streets in the dead of night, and often not knowing where to find refuge, in the midst of weapons pleading the cause of liberty, defending the oppressed with my head on the block, and thus growing ever more redoubtable to our oppressors and the public rascals.

"This kind of life, the mere recital of which freezes the most callous heart, I have led for eighteen long months without one moment complaining, without once asking for rest or recreation, without heeding the loss of my health, of my estate, and without blanching at the sight of the sword always pointed at my heart. What do I say? I might have been advanced, caressed, feted, if I had been willing merely to keep silent, and how much gold would have been lavished upon me if I had been willing to dishonor my

pen. I have repulsed the corrupting metal, I have lived in poverty, I have preserved my heart pure. I might have been a millionaire today if I had been less scrupulous and if I had not always forgotten myself.

"If I am going to abandon to my creditors the remains of the little which I have left, and without money, without assistance, without resources, I shall betake myself to vegetate in the only corner of the earth where I may still breathe in peace. Preceded by the clamors of calumny, defamed by the public rascals whom I have unmasked, loaded with the curses of all enemies of our country, abhorred by the great and by men in power, and set down by all ministerial cabinets as a monster to be stifled, perhaps I shall be forgotten by the people to whose advantages I have immolated myself; happy if the regrets of patriots accompany me; but I take with me the honorable testimony of my conscience and I shall be followed by the esteem of mighty spirits.

"However frightful may have been my fate during my long captivity, and however sad the prospect that opens before me, I shall never regret the sacrifices that I have made for my country or the good that I have wished to accomplish for humanity. I have fought without ceasing until this day, and I have not deserted the post of danger until it was taken by storm. If there is in France a single man of insight and determination who dares to reproach me with having too soon despaired of the public safety and with a lack of constancy, let him take my place and retain it for only a week.

"Citizens, I ask of you neither regrets nor gratitude—do not even preserve the memory of my name; but if ever some unexpected turn of destiny brings you victory, remember to make it assured by taking advantage of your success, and never forget, to assure your triumph, the advice of a man whose life was devoted to establishing among you the reign of justice and liberty."

I have quoted so largely from him because the man is revealed in his writings. In all the quotations, though there is in every statement an element of truth (he was an important revolutionist, he did break many men in political life), there is shown pathological

suspicion, a tendency to find evil in all men who would not follow his leadership, a total inability to measure himself correctly, intense egoism and megalomania. Political biography does not reveal any man who more strongly believed in government by murder than Marat. He was not a hypocrite, but firmly believed that the whole art, craft and mystery of statesmanship consisted in enraging the populace so that they would destroy.

Though *The Chains of Slavery* was written in 1774 and the first edition of *A Plan of Criminal Legislation* in 1780, it was about 1788 or 1789, the year of the fall of the Bastile, that he became a politician pure and simple and proceeded to attempt the task of saving humanity by preaching killing. He was a product of Rousseauism—Rousseauism filtered through a paranoiac brain.

I have not time to recite the political doctrines of Marat. Everyone knows them. He spread them by orations and by his paper, *The Friend of the People*. The people, according to him, meant only the propertyless and those without any occupation. They alone had the right to govern and to own because, according to his philosophy, they alone produced and originated all wealth. He made every difference of political opinion the occasion of a personal quarrel. If anyone disagreed with him that person was a scoundrel, a criminal, a murderer; he could not conceive that any man might hold views unlike his own and yet be honest. He had almost no friends, though many followers, and his judgment of men was almost always wrong. For example, on Mirabeau's death he wrote, "People, give thanks to God. Your most redoubtable enemy has fallen beneath the scythe of fate. Riquetti is no more; he dies a victim of his numerous treasons, victim of his atrocious accomplices. . . . Adroit rogues, to be found in all circles have sought to play upon your pity, and already duped with their false discourse you regret this traitor as the most zealous of your defenders." This is his sincere opinion of a statesman who sane Frenchmen had hoped would live, knowing that he alone could chain the wild men and thieves who were ruining the country. Marat had no conception of constructive statesmanship; all his opinions were destructive and hence he could not in any degree comprehend a man of Mirabeau's type. Mirabeau knew that there

are natural political laws just as there are natural physical laws. Marat could not conceive this. Though he had been trained a little in natural science, his intellect was not of the kind that can really form a conception of the meaning of a natural law. He could not conceive inevitability. Mentally he, in his earlier life, in many ways resembled the sentimental sympathizers with Bolshevism who are today making so much noise in America. It is noteworthy that almost all the American-born among them have led shielded lives, have never been in contact with the realities of life, have never had to work (their fathers did that for them), and the women have failed in woman's first and natural function; while the foreign-born are internationalists, are parasites, and left the countries of their birth for their countries' good.

It is not easy to discover what his physical appearance was. No one has given an unbiassed, unemotional description. Carlyle, who was not a historian, but a master of a certain dramatic style, an artist, and who thought, probably correctly, that truth is greater than fact, describes him as a "large-headed, smoke-bleared, dwarfish individual with blue lips." A contemporary says he was five feet high, with bow legs, a very large head, and aquiline nose. Fleischmann, a recent writer, says he had brilliant eyes, full of fire and as one cheek was higher than the other the two eyes were not in the same horizontal line. Madame Roland, an unfriendly and contemporary witness, relates in her memoirs that his open shirt showed a yellowish chest and that his long finger nails were filthy and his face hideous. Dr. John Moore, a sane observer, who traveled in France during the Revolution and saw him many times, says, "Marat is a little man of a cadaverous complexion, and a countenance exceedingly expressive of his despotism: to a painter of massacres, Marat's head would be inestimable. Such heads are rare in this country (England), yet they are sometimes to be met with at the Old Bailey." One quality which, under most circumstances, all men praise, Moore credits Marat with, but damns him for. He writes: "this man certainly possesses a great deal of courage both personal and political. No danger can terrify him, nothing can disconcert him: his heart, as well as his forehead, seems to be made of brass."

From about 1789, he suffered continually from a skin disease which caused an agonizing pruritis. The only relief he got was from a continuous bath and much of his writing was done while bathing. Cabanes, who made a very careful study of him, concludes his skin disease was eczema, that he was hypochondriacal, had insomnia and constant headaches and that all his mental peculiarities were largely bound up with his bodily suffering. Dr. C. E. Wallis quotes Dr. Graham Little as being of the opinion that the skin affection was probably a dermatitis herpetiformis, on the ground that the irritation and pain from which he suffered were alleviated by sitting in a bath of water, whereas eczema itself would have been aggravated by contact with water. Whatever his skin disease may have been, the agony of the pruritis was intense, and for years he had no relief save when in his tub. He stayed in it for hours, worked in and was killed in it.

A word about his murder. Charlotte Corday, a woman lacking three months of twenty-five years of age, murdered Marat on July 4, 1793. Her life contains nothing of interest save her one act of crime, which she believed to be an act of heroism. She was the daughter of a rather decayed gentleman, and at the time of the Revolution was living in Caen. She read with all the fervor of the time Plutarch, Rousseau and Voltaire, and conjured up in her mind a picture of the Roman Republic such as never existed and hoped that France would soon be a modern antique Rome. She was in sympathy with the Girondists whom Marat hated. She went to Paris, bought a knife, visited Marat while in his bath, spoke a few words and stabbed him, making a wound "between the first and second rib, traversing the upper part of the right lung as well as the aorta, and going into the left clavicle." He died. She tried to escape, or did not, according to whether you believe anarchists or sane men. She was made at midnight to confront the corpse. She bore the ordeal well, indeed was quite heroic, and said, "Yes, it was I who killed him." She was guillotined. Meanwhile the mob made a god of Marat, and then, after the fashion of the mob, very soon ceased to worship in order to curse, and destroyed all memorials in his honor.

Where should Marat be placed in a psychological classification

of men? Paul Lecroix some fifty years ago wrote: "There were two Marats—the Marat who is known to everyone, and the other Marat whose existence no one at the present day suspects: the one was the pupil and admirer of Rousseau, the lover of nature, the learned author of many discoveries worthy of mention in chemistry and physics, the energetic and brilliant writer who produced a book of philosophy worthy of the philosopher of Geneva—the one who wrote only scientific, philosophical and literary works; he was a doctor in the Comte d'Artois's bodyguard; he died, or rather he disappeared, at the end of the year 1789, to give place to his namesake." G. Edward Wallis, in his interesting little pamphlet, explains him by the same assumption of two personalities: (1) the one, that of a scientist and philosopher, which died in 1789; (2) the other, that of a fanatical journalist, pamphleteer and demagogue.

Dr. Cabanes seems to believe that his mental peculiarities were very largely the result of his physical ill-health. Many of his contemporaries, not only physicians but also men of business and of affairs, solved the problem by the diagnosis of simple lunacy. A few writers of recent date, men in sympathy with his ideas, claim that far from being an insane man, he was a political genius, but one must not take them too seriously, because they are living in a mental world so topsy turvy and in a moral world so vacuous that they regard crime as being proof of moral independence and clear thinking as evidence of lack of mind.

Lecroix and Wallis's theory of two personalities is figurative rather than a statement of scientific fact. His case was not one of double personality. There was no break in his personality, no sudden change in his character. His behavior changed, not because he changed but because the stimuli acting on him changed. He began to be political while still practicing medicine and many of his peculiarities, especially his megalomania, are shown even in his medical writings. As always happens in true paranoia, there was a long prodromal period, and it took years for his insanity to come to its fruition.

I cannot altogether agree with Cabanes. Pruritis, no matter how severe or how long lasting, cannot cause the clinical picture

that Marat presents. It is possible, however, that the pruritis was only an external manifestation of some disorder of metabolism, which acted not only on the nerve-endings in the skin, but also on the cerebral cortical cells. This, of course, is purely hypothetical but the mystery of mental abnormality surely will be explained on physical grounds. Many writers speak of his head as being monstrous in comparison with his height, which was less than five feet. He may have been hydrocephalic, or may have had some disorder of his pituitary gland leading to abnormal bony development, though his facial bones and hands do not indicate this (he was not acromegalic), and associated with it there may have been a congenital tendency to mental abnormality. He did not have the goodnatured temperament usually found accompanying disease of the pituitary body. The whole matter of the relation of the ductless glands to mental function is in a nebulous state, but the twentieth century may see proved, that what one's attitude toward life is, how one explains the riddle of the universe, how one behaves, may depend in some degree on little glands that not so long ago were regarded as vestigial.

I have said there is not time to describe his political life and opinions. We must, however, pay some attention to them. He started his paper, *The Friend of the People*, at the beginning of the Revolution. He used it solely to abuse pretty nearly everyone, not only the king, the ministers and the nobles. He preached not only revolution, which would have been entirely sane, but murder and general theft. He took a large part in arranging the proceedings of the mob of women who went to Versailles and brought the king to Paris. He urged the soldiers to murder the officers. Several times he was denounced but always escaped by flight or hiding. In 1790 he was denounced but the Cordeliers rescued him. Lafayette laid siege to his home, but he found asylum with an actress friend. In the same year, he proposed a law to the assembly, that "eight hundred gibbets ought to be erected in the Tuilleries, to hang all traitors, beginning with the elder Mirabeau." It failed to pass. He hated the Gironde party. He was one of the organizers of the massacres in the prisons—a butchery which Robespierre continued under shadow of law. He boasted that a

dictator was needed and that Robespierre was the one fit man. He declared that it was necessary to guillotine 270,000 people in order to free France.

The gentlemen who regard him as a political genius, *e. g.*, the sincere members of the Bolshevik party of today, not only in Russia but also in this country, are themselves mentally abnormal. He is not the only lunatic in history who has had a following during life and after death.

Let us sum up his life and see whether we have data enough to classify him. The test of a man's sanity is his behavior; behavior being the visible signs of mental reaction to stimuli. When it is in consonance with the time in which and the place where a man lives, his local environment, his racial and his family inheritance, and his formal education, he is sane. Of Marat's ancestral history we know nothing. We know too little of his parents to form a judgment as to whether they were wholly normal or not. They surely were not noticeably abnormal and his young life was passed happily. It is true that his father worked at many different things in at least three countries, and though this makes us think of the possibility of his lacking fixity of purpose, it does not prove it.

The time in which Marat lived determined the twist his mind was to take. Had he been living in America a generation ago he would have been an ardent, I will not say disciple, but rival of the leader of the Populists; today he would, if living in America, be a chief among the anarchists of the east side of New York, and probably would be making speeches before admiring audiences of gentle male and female femininists, with soft hands and softer heads, who think they are broadening their minds by listening to arguments in proof of the righteousness of murder, he meanwhile wondering how soon his real associates would get a chance to string his audience and all their relatives to nearby lamp-posts.

The French Revolution was brewing many years before it came to a head and Marat lived in an atmosphere of moral unrest and intellectual turmoil. But environment, like all exciting causes, requires a favoring soil or it will not produce insanity. The soil is the protoplasm as it exists in germ cell and sperm cell at conception.

Was the soil of Marat's personality, his protoplasm, favorable to the growth of mental disease? Undoubtedly, yes. He, as a youth, became saturated with the doctrines of Rousseau. Boys of other types react in other ways toward such doctrines, most of them merely negatively, not having understanding, while a few, those having real intellectual acumen, can see and have sympathy with the portion of truth mixed with Rousseau's emotional idealism. He had great, indeed overwhelming ambition, mediocre intelligence, infinite conceit, was very emotional (like the murderer who weeps to see a fly killed), had no real sense of justice, was a worshipper of the god Gab, and was entirely selfish. He had a little undigested learning but no power of reasoning. He lived in a wild time, when the crooks and the cranks led the imbeciles, of whom there are many in every country, to wholesale murder. Marat wanted to be a leader. He believed that he could rule the country if only enough people were killed. He was shrewd enough to know that if he shouted long enough and loud enough that he was the people's friend many would believe and follow him. His creed was simple — all the rich own belongs to the poor because they stole it from the poor. His theory of government was equally simple. If you do not agree with me you are not a patriot; if you are not a patriot the proper punishment is death. Therefore we will kill everybody who disagrees with us and then we will have the millenium, the brotherhood of man. So he justifies himself and as time went on his murder lust increased. His creed thus far would be interpreted by many as indicating criminality not insanity, but this opinion is unjust to him.

An important and unquestionable symptom of mental disease was his delusion of persecution. From the time of publishing his *Chains of Slavery* until his death, he was the victim of this delusion. True he had many real enemies in the Revolution who would gladly have killed him, but everyone, the English cabinet, philosophers, men of science, everybody was, from his point of view, intriguing against him, preventing success in medicine, stopping by conspiracy the sale of his scientific works, keeping him from political power, just because they envied him. Another symptom

was his megalomania. Statecraft, which the wisest men of all the ages have been struggling to master, he comprehended intuitively, with an infallibility of judgment equal to that of a god. Lacking all power of reasoning, of examining the facts of any question, weighing them and then drawing conclusions, he imagined he was a political genius, and more, a savior of the people.

He belongs then among the insane and is an example of paranoia of the political type. He presents the cardinal symptoms of paranoia, intense egoism, delusions of persecution, and an angry grandiosity. He has a common secondary symptom, viz., unlimited verbosity—the matter of his speeches being always the same—the wickedness of his persecutors, his own virtue, wisdom, and unselfishness. He had the paranoiac's intensity of manner in speaking and the tremendous verbal diarrhea which deceives the common man, who, overwhelmed by the cataract of talk, goes home feeling that the orator must be a profound thinker because he talks so well.

His moral code was wrong and yet, like all paranoiacs, he regarded himself, it was not a hypocritical pose, as virtuous. His career was cut short by Charlotte Corday, but some of his sane contemporaries say he would have been locked up as a madman in a short time had he not been killed. They were right, because his obsession of persecution was growing stronger and stronger every month in the latter part of his life. The alternative would have been the guillotine which his political enemies would not have hesitated to use.

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## DISCUSSION

Dr. Francis X. Dercum: We have all enjoyed Dr. Burr's interesting, psychiatric analysis of a great historical character; great, though a lunatic; and great, though a criminal, and one who was regarded by some of his day as a heroic and important personage. Dr. Burr's paper also is timely. It suggests that some of the characters playing a role in the history of Russia today or who will tomorrow play a part in the drama of middle Europe are individuals of similar make-up.

# A FEW OBSERVATIONS UPON PNEUMONIA IN THE ARMY IN THE UNITED STATES DURING THE WINTER OF 1917–1918[1]

By J. HAROLD AUSTIN, Major, M. C., U. S. A.

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The important medical problem in the army is no longer the gastro-intestinal diseases but the respiratory. This is due chiefly to the success of prophylactic vaccination against typhoid and paratyphoid fevers. About 65 per cent. of the deaths in the army in this country in 1917 were due to pneumonia, either primary or secondary to measles. The latter disease is serious only when complicated by pneumonia.

The parallelism between the incidence of measles and the proportion of rural population in the troops from any given State is striking.[2] This may mean that the individuals from urban districts are immune because of infection in previous years and that the individuals who develop measles in the army are those who have escaped it previously.

Pneumonia from the standpoint of the army is a contagious disease or rather it is a group of contagious diseases due to more or less closely related but distinct organisms. Its tendency to spread from individual to individual is less than is the case with measles, but the evidence of its contagious nature is unmistakably clear. Among the demonstrated facts supporting this view may be instanced the following:

(*a*) In careful bacteriological surveys of the pneumonia at certain camps, the victims from the same tents or from certain

[1] Read October 2, 1918.

[2] Vaughan, V. C., and Palmer, G. T.: Communicable Diseases in the National Guard and National Army, Jour. Lab. and Clin. Med., 1918, iii, No. 11.

squads, men that have been living in close contact with each other, have succumbed to the same type of pneumococcus; those from another tent or squad to another type of pneumococcus.

(*b*) Certain types of pneumococcus have been absent for weeks at a time from some of the camps—later to appear and then spread, claiming a number of victims.

(*c*) Certain strains of streptococcus have spread through barracks and hospital wards producing pneumonias in epidemic proportions. These organisms exhibit a rather greater tendency to spread than do the pneumococci.

(*d*) If the incidence of primary pneumonia be determined according to the States from which the troops were drawn, it will be found that the curve for the incidence of primary pneumonia follows that already described as characteristic for measles and for the distribution of rural population. The parallelism is quite definite. All cases of pneumonia that occurred secondary to measles are of course excluded. This suggests that the same factor of a previously acquired immunity, in this case by previous contact with the many different strains of pneumococcus encountered in a closely populated community, renders the individuals from urban centers relatively immune to pneumonia as contrasted with those from rural districts.

(*e*) The fact that when a group of individuals is vaccinated against certain types of pneumococcus, the group is for a period absolutely protected against pneumonia due to these types of pneumococcus and exhibits a proportionate or more than proportionate diminution of pneumonia—this fact is perhaps the strongest evidence in support of the conception that pneumonia is a group of transmissible diseases due to several distinct but related organisms.

During the winter of 1917–1918 the etiological organisms in the pneumonias in the army studied from this point of view were approximately as follows:

| | | |
|---|---|---|
| Pneumococcus, Type | I, | 15 per cent. |
| | II, | 10 " |
| | III, | 3 " |
| | IV, | 32 " |
| Streptococcus, hemolytic | | 40 " |

Of much interest and value is the delineation of the symptomatology and pathology of streptococcic interstitial bronchopneumonia given by Cole and MacCallum.[1] The problem of distinguishing biologically different types of the hemolytic streptococcus remains to be settled.

Patients with measles appear to be especially susceptible to the streptococcus. It seems desirable, therefore, to culture the nasopharynx of all measles patients and of the attendants in these wards and to rigidly segregate any carriers of the hemolytic streptococcus. In this way the pneumococcic complications of measles have apparently been greatly reduced in at least one camp.

Protective vaccination against the commoner types of pneumococcus has been successfully carried out in South Africa and in this country at Camp Upton by the Rockefeller Institue.[2] This has resulted in complete protection of the vaccinated individuals. This method is a promising one for the control of pneumonia in the army.

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## DISCUSSION

Dr. Alfred Stengel: The subject under discussion is so essentially new that there is little any of us can say from the standpoint of experience. I should like, however, to comment on the advantages derived from such investigations as this and others that have been made possible by the establishment of the various Army Hospitals in connection with cantonments. Medical investigators have in the past been compelled to reach their conclusions largely on the basis of individual experiences or, at most, of observations in connection with small groups of cases occurring in hospitals; but it has rarely been possible for them to study very large numbers of patients as has been done during the past winter by those attached to the Army Hospitals. This mass method of investigation will undoubtedly lead to many new conceptions. I confess that my own thoughts have frequently been directed toward the effect of the close association of individuals and sometimes of overcrowding as a factor contributory to the type and character of epidemic diseases. This possibility should not be lost sight of and must undoubtedly have a bearing

[1] Cole, R., and MacCallum, W. G.: Jour. Am. Med. Assn., 1918, lxx, 1146. MacCallum, W. G.: Jour. Am. Med. Assn., 1918, lxxi, 704.

[2] Cecil, R. L., and Austin, J. H.: Jour. Exper. Med., 1918, xxviii, 19.

on all sorts of infections. We have heard much about mass psychology and perhaps something might be said of mass susceptibility. The bearing of this thought on the present paper is merely to suggest that a pursuit of the infective organism alone and the development of methods for conferring protection on individuals against the action of such organisms should not lead to a neglect of the hygienic regulations that have been found advisable where large numbers of people are in close contact. I have been impressed in the recent epidemic of influenza with the rapid extension of the disease among sailors in barracks and its earlier appearance among them. Other people have been in close contact as any one can observe in the streets and public places, but the continuous contact of those in military life is an added and important factor. Perhaps there is also something in the circumstances under which these men are so associated—their absence from home, the unusual hours of sleeping and resting, changed dietary, etc. For these reasons perhaps, protective inoculation may fail of its complete usefulness if the impression should prevail that such a specific protection warrants neglect of other precautions. It is true that in the case of typhoid fever, inoculation has practically wiped out the disease even in camps and among those closely grouped in barracks, but it must be remembered that the important contributory conditions operative in this disease, namely, tainted water, milk and other food, have at the same time received the closest attention.

Dr. David Riesman: What Major Austin has said about the experience in the army is of the greatest possible value to those of us engaged in civilian practice, a practice which is harder at this epidemic time, I think, than it has ever been before. The problem of pneumonia must be attacked in both civil and army practice in much the same way. The environmental factors pointed out by Dr. Stengel must be met. In typhoid fever this has been done in a large measure by the control of water, milk and food supply; and there must be ways of attacking the environment in the case of pneumonia, although it is not as clear where we shall attack it as it is in the gastro-intestinal diseases. I have not much hope that we shall be able to cure pneumonia by a sovereign specific, but feel we may look forward to results similar to those achieved in the case of smallpox and typhoid fever, for neither of which we have any specific cure and yet both of which are under almost complete control. We have conquered them by vaccination and by sanitation and it is along the same lines, particularly along vaccination, that the pneumonia problem now should be attacked. Seemingly, Dr. Austin and Dr. Cecil have done this with success. The pneumonias are as well defined bacteriologically, though not clinically, as the various diseases that were formerly grouped under the head of typhoid fever. We now have at least three distinct diseases—typhoid fever, paratyphoid A

and paratyphoid B—and there is probably a heterogenous fourth group which I have called entericoid fever, and which includes a variety of infections due to organisms morphologically similar to the typhoid bacillus bacteria. The same thing holds true of pneumonia. The pneumonias due to Types I, II and III are distinct diseases so far as their serologic reactions are concerned. In the recent Boston epidemic studied by Keegan there was not a single instance of Type I pneumonia, although the pneumonias of Types II and III were plentiful.

The prevention of pneumonia is the most serious problem we have today in Philadelphia. I do not look upon the pneumonia we are now having as a complication of influenza but as a part of nearly every severe infection with the influenza poison, or perhaps with a streptococcus. If the patient receives a massive dose, he may die in one or two days without any signs of pneumonia, from an overwhelming edema of the lungs. If the dose of poison is smaller either a bronchopneumonia or a lobar pneumonia develops. The disease usually begins in the lower lobe, some distance above the base, most frequently about the angle of the scapula or a little to the outer side. Cyanosis is a striking feature. It is different from that seen in ordinary pneumonia; it comes on early, and is widespread over the body. The tongue and finger-nails are blue and the lips of a maroon color. It is, I believe, due to a direct action of the poison on the blood and not to the local disease of the lung. In many ways it resembles the cyanosis produced by acetanilid or coal-gas poisoning and may properly be called hemocyanosis in contradistinction to cardiocyanosis and pneumocyanosis.

The prevention of this very fatal pneumonia is the task before our Department of Health, and I feel that the College of Physicians ought to aid the department by going on record in the form of a resolution on certain aspects of the problem. The newspapers today state that 700 cases have been reported. This is very far short of the actual number of cases existing in the city. Physicians have no time to make reports and are not especially interested in doing so since quarantine is not established. I should like to propose a discussion by the Fellows of the College on the subject of closing the schools, the theatres and other places where people congregate in numbers, at least in those sections of the City most affected by the disease. Furthermore, large buildings should be obtained for additional hospital space. It is almost impossible to get nurses. If more people were sent to hospitals, fewer nurses would be needed, and by the same token one doctor could take care of more patients than if he saw them privately. In the prophylaxis against pneumonia I believe vaccine therapy to be of value. Although the method will require a long trial for final judgment, the results achieved by Dr. Austin give promise of hope.

Dr. S. Solis-Cohen: I am very glad to hear Major Austin's remarks because I have communicated with several medical officers of the army,

asking them to carry out these tests. So far I have received no favorable response. I trust that Major Austin will test this out thoroughly. It is a great advance, I believe, in practical medicine. Although my name is associated with that of Dr. Heist in the paper I am not to be credited with the technic of the method, merely with the direction of the research to that end. I have long felt that when we test a preventive measure merely by the statistical method observing that so many persons have a chance to gain the infection in a certain time but did not, there are many chances of error, to say nothing of the time lost. But if we have a definite way of showing within a comparatively brief period that immunity is present we can be more confident in our conclusions. As regards the quantitative test, it is unquestionably rough. There is no exactitude; but we have approximations and Dr. Heist can tell you more accurately how by the study of the microscopic slides it is shown that some concentrations are more active than others. It is to be admitted, however, that we have an unknown number of bacteria in the culture to start with and many other unknown quantities later. Yet it is about as accurate as our method of representing sizes by "hen's eggs," or "oranges," represents about the measure of the exactitude that we reach in this quantitative test. The qualitative accuracy is beyond question and our observations have been confined to those of Dr. Kolmer and his associates and those of my nephew Myer Solis-Cohen. The question of vaccines and of the mechanism of immunity is brought up by these subjects but is too large to discuss at this time. I believe, however, that all our experience with the use of bacterins in prophylaxis and treatment, not only in pneumococcus infections but in other infections shows that we were wrong in believing immunity to be exclusively specific. There is a general immunity plus a specific immunity and measures directed toward the energizing of the general immunization processes may be effective even where a specific is lacking. There is something in what we call the living or flowing blood not present in the serum. Dr. Heist and I made a number of experiments with the serums of patients treated and recovered and also with serum taken during the course of the disease with very unsatisfactory and contradictory results. We were forced to conclude that if there was antibacterial immunity in the blood of recovered patients it did not reside in the serum, or resided in very small amount in the serum and this notwithstanding the results reached by the Rockefeller Institute. There is also something peculiar about the behavior of the equinized serum not only in reference to the pneumococcus, but also to other organisms. That perhaps may be worked out in connection with the living blood or may not. I do think that Professor Lacy and Dr. Heist have made a sufficient advance in our methods of investigation to warrant my use of the term "Lacy-Heist method" of studying immunization.

# GUNSHOT WOUNDS OF THE CHEST[1]

By Colonel GEORGE E. GASK
LONDON

I think that I might preface my remarks on the treatment of gunshot wounds of the chest by a very short general review of gunshot wounds in general, for the reason that a very great change has come over the whole of our treatment of gunshot wounds. At the beginning of the War we were horrified to find what we did not expect—perhaps we ought to have expected it but did not—that every single wound was suppurating. All our efforts at that time to get clean wounds were futile. It looked as if we had gone back into the pre-Listerian period, and our thoughts turned toward carbolic and oils and mercurial ointments and to all the old forms of ointments and salves of the middle ages. It was only very slowly that our eyes were opened to the uselessness of all these methods, and we went through, as we have often said, in a period of two or three years, all the thirty years since the time of Lister, and we gradually abandoned these remedies altogether. We have reached now a period in which we have realized that the essential treatment of all gunshot wounds is the early mechanical cleansing of that wound by open operation conducted under aseptic precautions, by which means all the devitalized tissue is cut away, all foreign bodies, whether of bone, or metal, or portions of clothing, removed, and all blood-clot taken out before the time when organisms which have been introduced by the missile have had a chance of multiplying and invading the tissue. That is to say, that the

[1] Read November 5, 1918.

broad line of distinction is drawn between contamination and infection. All gunshot wounds are contaminated, but they may be operated on quickly and rendered sterile to prevent infection. The space of time in which the organisms enter the tissues is somewhere inside of twenty-four hours, and the best time to do the operation is as early as possible. In the majority of cases the operations are done within twelve to fifteen hours from the time of injury. That is the position to which we have come regarding gunshot wounds in general, and those principles which I believe to be true and based on biological foundation have been applied to wounds of the chest. For the first two years of the War we did not touch chest wounds; we were told not to; we were afraid to do any sort of operation on the chest. The men were treated by what we called medical means; they were put to bed, given morphin if in pain, given a cough remedy if there was cough, and allowed to lie in bed, and we hoped they would get well. Quite a number did, but a larger number died and a large number became extremely septic, had empyemata with pus discharge. The only surgery that was done was the removal of an inch or two of rib and a tube put in. The mortality, therefore, from these wounds was very great and the disability resulting from the empyemata was also very great. We did not change the treatment until the end of 1916. Throughout the time of the Somme fighting we had not the opportunity to really think, for the number of urgent cases that had to be operated on were enormous. All we could do was to pass these men with chest wounds into a ward where nothing was done for them, and they lived or died, as it seemed to us, by chance. We gradually began to work on them and by other steps arrived at our present position.

It was necessary to find out why these people died, and it was only when we had time to make postmortems that we could find that out. We discovered, broadly speaking, that we could divide the deaths in thoracic wounds into two categories: Those who died on the battlefield or within a few hours, and those who died in from forty-eight hours to two and three weeks afterward. Those of the first lot died almost entirely from hemorrhage, either

from one of the big vessels being hit or from a gross injury to the lung, for which one could not expect to do much surgically. Those who died in the latter period died almost invariably as the result of sepsis, commonly of empyema, or septicemia following lung abscess; bronchopneumonia or suppuration of some sort, all the conditions resulting from infection carried in by the missile. That was an important factor to establish. Our next step was to find out the channel of infection. We used to look upon the missile as being the real danger; of course, it is the infection which the missile carries in with it—the piece of cloth, the bit of dirt carried in. That is not the only channel of infection. You have the wound in the chest wall. As I mentioned to you before, every wound suppurates unless mechanically cleansed by an early operation. We did not then cleanse the chest-wall wound and it necessarily suppurated; unless by inflammation the track of the missile had been sealed, organisms entered through the track into the pleural cavity and empyema resulted. A third channel of infection was through the wound in the lung. The missile lodged in the lung with the little bit of clothing or bit of shell. An abscess forms, discharges into the pleural cavity, the man gets empyema and dies or runs a good chance of dying. The great principle we arrived at was to effect an early mechanical cleansing of the wound of the chest wall and to clear out anything that was in the pleural cavity, to clear out the blood-clot, cleanse the lung and restore its function. It seemed a big thing at first, but in the end the realization came fairly quickly.

In order to arrive at this conclusion a large number of people had to be examined carefully and the system adopted was as follows: The patient admitted with a penetrating wound of the chest was put to bed and then carefully examined regarding chest wound and any complicating wound. Many of the chest wounds had wounds involving the spinal cord or abdomen. The chest itself was examined for hemothorax or pneumothorax, movements of the diaphragm, position of the heart, any indication of respiratory distress. *X*-ray examination was used whenever possible and in the majority of cases we had *x*-ray apparatus in the advanced hos-

pitals. In such ways we tried to get as accurate a knowledge as possible of what was going on inside the chest wall. Coming to the conclusion that the wound of the chest wall had to be excised, we cut down upon the rib or scapula, finding it necessary often to excise ragged splinters with a pair of shears. We could then see the whole condition of the chest. Very often we found bleeding in the costal artery. This we first thought came from the lung. The artery was tied. Inserting a finger there could be felt splinters of bone filling the cavity or sticking in the lung. When we came to that position we had a patient with a hole in the chest through which air sucked in and out. These open-thorax cases, as we called them, proved uniformly fatal. It is easy to understand that a wound of the chest wall will become septic if the air is sucked through twenty times a minute, sucking organisms into the cavity.

Then we were led to enlarge the wound of entrance, excising a further portion of the rib so that with the use of rib spreaders we could see actually into the interior of the chest, put our hand inside the thoracic cavity and remove foreign bodies. Rather to our astonishment, we found that the patients stood these operations very much better than we thought they would. The main point which was proved in the first few cases banished forever the principle which I personally was taught to believe: that handling of the wounded lung would cause recrudescence of bleeding. That conception I believe to be absolutely and entirely false. My belief is that in a wound of the lung the bleeding and pneumothorax cause collapse of the lung and the collapse causes cessation of the bleeding. In only 2 cases of the many hundred operated on bleeding had not stopped at the time of operation. Many of the cases were opened within twelve hours after injury and in all but 2 had the bleeding stopped. With the lung fully displayed and in one's hand there was no recrudescence of bleeding. In 1 of the 2 cases the lung was unable to collapse because of old adhesions holding it up to the chest wall. In the other case splinters of rib were protruding from the wound in the lung, preventing that portion from collapsing. In both of these cases in which bleeding

was continued it was the easiest thing in the world to tie a bleeding point; so that even bleeding can be controlled. We have more reason for operating, therefore, than for leaving these cases alone.

Upon opening the chest the first thing the surgeon notes is the chest full of blood—30, 40 or 50 ounces of fluid blood. He at once removes the blood by mopping it with sponges or scooping it out with the gloved hand. As soon as that is done the lung comes into view; the diaphragm is seen moving up and down and the mediastinum in and out. The surgeon then looks for foreign bodies, which may be found in the pleural cavity. He then examines the lung as he would a coil of intestine. One can take hold of it with a pair of forceps that does not crush and examine it between the fingers; or, put the hand inside and take the lung between the fingers and the thumb palpating every portion for the foreign body which when found is extracted. If it is lying close to the hole it may be picked out through it; if it has penetrated deeply into the lung a fresh incision may be required in the lung itself. One does not mind that unless it is near the hilus. A short, straight incision is made. Any bleeding is easily controlled by deep catgut sutures. We must still apply the general principle that a wound in the lung must be cleansed as it would be in a wound of any of the soft parts. If the wound is in the superficial part of the lung it is easy to make an elliptical incision, excise the dead tissue and suture. If the wound is through an edge of the lobe it is easy to make an excision and with a through-and-through suture close the wound. If, however, the wound is a through-and-through one from the top to the base of the lung one must take an extra risk and do one's best to cleanse the lung by running a piece of gauze through the hole and using it like a pull through. The lung is next sutured, that the infecting material may not run out through the hole in the lung and infect the pleural cavity. We know that the lung is capable of taking care of many organisms without forming an abscess. As a proof of this it is unknown to see gas gangrene of the lung in spite of the many cases in which foreign bodies are left in the lung. Therefore, it is a matter of practice to close every wound in the lung. I fancy restoration of function is accomplished

much more quickly when the lung is put in as nearly normal condition as possible at once. Cleansing of the pleural cavity is of the utmost importance. The lung is dried and mopped clean; ether, salines and various antiseptics are used. We get rid of every scrap of dead tissue, leaving the cavity dry and doing as little traumatism as possible.

The next and final step is the closure of the chest. It was a considerable revolution of thought to many people that the chest must be placed in a state as nearly normal as possible. This is, however, in keeping with the principles of surgery as applied to every wound. Closure is done as in closure of the abdomen when possible; muscle to muscle and skin to skin. There may be a gap where the part has been shot away; then you will close the muscle over the hole, covering over with the skin and the case will do well.

One word about the anesthetic. I had an idea for a long time that if we opened one side of the chest the man had a good chance of dying from asphyxia. This is not true of gunshot wounds of the chest. Many hundreds of cases have been penetrated in that way and there is very little danger of asphyxia if the other lung is working. An anesthetic may be given with safety if one has fair function on one side. The type of anesthetic varies. I had a predilection for chloroform and we did many hundreds of cases without any trouble. The French, Major Duval tells me, almost always employ ether. I know Americans use gas and oxygen; many use local anesthesia and get good results. I think I would be right in saying that the type of anesthetic as long as it is skilfully given is not of very great importance.

The after-treatment is important. It is very necessary to watch that the man does not get a big pleural infection. The operation does not get rid of every single organism and if a convenient medium is given in which to live they will grow and flourish. For that reason it is always advised to needle the patient—to aspirate the chest at regular intervals.

Do not go away with the idea that I have recommended that every single chest wound should be operated upon, for that is not true. I suppose that not more than 30 per cent. of penetrating

wounds of the chest are operated on; a good many, in our opinion at the present time, do not require it. In our experience the indications for early operation are: (1) Wounds of the soft parts of the kind requiring operation in any other part of the body. (2) Bleeding from that wound; intracostal hemorrhage; many people died from comparatively small hemorrhage which could have been easily stopped. (3) Fractured ribs; all badly fractured ribs ought to be operated on because the splinters may be driven into the lungs and it is not possible to make a diagnosis without the *x*-rays. (4) Cases with large foreign bodies lodged in the lung should be operated. (5) Cases with pneumothorax, in which a wound allows the air to come in. We believe there is left a very large percentage of small clean wounds in which there is no very great amount of empyema or damage to the lung in which people do comparatively well without operation. In the cases of hemothorax without extensive wounds, splintered ribs or retained bodies there is at present a diversity of opinion. We are inclined to lean toward operation, although our practice at the present time is not to operate unless the wound shows some signs of sepsis. Theoretically, there ought to be no such thing as an infected hemothorax, but, practically, there are a considerable number of such cases. We have no means of telling which will become septic. With signs of sepsis it was the former practice to make one or two incisions and insert drainage tubes. This is wrong, though possibly practicable in civil life. There should be made immediately an incision sufficiently large to clear out the whole contents of the pleural cavity, with removal of all blood-clot. The wound should be made dry and the chest closed and kept closed even though infected. This is done for the reasons: (1) That the patient is not so depressed as when his chest is open; (2) a certain number will remain closed and never have to be opened up again; (3) closure of the chest (and this I believe is really a great truth) helps to expand the lung. If the chest is closed every movement tends to expand the lung as soon as the air is absorbed. If for any reason pus is formed it is a simple thing to remove a stitch and put in a tube and drain the chest. I should regard the drainage of empyema

as I would regard amputation of the leg—sometimes necessary, and still a surgical failure.

This treatment of wounds of the chest is growing very fast. Two years ago only one or two men were carrying it out. Now, in almost every hospital at the front line it is being practiced. I believe the principles are sound. We have had the supreme pleasure, the greatest pleasure the surgeon can have, of seeing many patients who previously would have died being restored to health and strength.

# LATER STAGES OF GUNSHOT WOUNDS OF THE LUNGS[1]

By Major G. GRAY TURNER
NEWCASTLE-ON-TYNE

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This is an aspect of the subject which cannot be overlooked and is becoming of increasing importance. For the coördination of the work carried on in the advanced hospital centers it is necessary that the after-results should be understood and thoroughly studied. You are at the present time confronted with the same problems that we had to face after the first few months of the war, because many of the cases that it is impossible to deal with in the front line will come to you suffering from the effects of wounds which will require some treatment. Now, in the early stages of the present trouble it was not the custom to carry out any active surgical intervention and the practice of the surgeons at the front was reflected on the practice of those in the stations behind the battle line. As a consequence, quite a number of cases suffering from penetrating wounds of the chest and cases with retained foreign bodies in the chest came to the base hospitals at various periods after receiving the casualty. It was then the custom to have nothing done. No ill effects followed and it was hoped that all danger would disappear in the fulness of time. It was soon found that this was a too optimistic view to take, and about the middle of the year, 1915, some of us determined to look more carefully into these cases and see if the men could not be given some relief by active surgical measures. We found that many were suffering from injury of the parietes, others from retained foreign bodies;

[1] Read November 5, 1918.

there were others with incompletely absorbed hemothorax or with a persistent sepsis in connection with the hemothorax. Another particularly interesting group presented through-and-through wounds in which the patients made a rapid and immediate recovery but complained for a long time after receipt of injury. Then there is always a group of miscellaneous cases in which there are foreign bodies in the mediastinum or in connection with the diaphragm. We found that in the first group, that of injuries to the parietes, many of the cases of disability were due largely to the fear of consequences because of the attitude taken that such injuries were not to be interfered with. This led to certain neurasthenic symptoms not due to the injury. In some of these cases we found, however, that there was injury to the underlying lung. We have found the most useful method of examination in these cases to be the fluoroscopic screen. This will often reveal a surprising amount of pathology, considering the limited physical signs present.

With regard to the second group, that of retained foreign bodies, what we wish to know is the effect of the foreign body in the lung. In a limited number of cases the foreign body gives rise to irritative symptoms—chronic cough, hemoptysis and sometimes gives rise to symptoms suggestive of suppurative processes in the lung. In these cases there is nearly always persistent shortness of breath. We have found upon operative interference bandlike adhesions in the track of the bullet which are the site of persistent infection. The infection is due possibly to the movement of the lung and the rapid action gives rise to pain. The limited movement is interpreted as shortness of breath. This is not corrected by the ordinary means. In some cases there will be unabsorbed pneumothorax or hemothorax.

The best results are obtained in those cases of gunshot wounds in which there has been a through-and-through wound. These cases, in spite of the apparent gravity, make a good recovery up to a certain point. The patient is discharged and often goes back to the regiment for light duty. My experience is that these men repeatedly break down under the stress of guard exercise and military training, and these are the men who kept coming in and

out of the hospital with incomplete relief of symptoms. In these cases we do not get much help from the physical examination without the use of the fluoroscope. In these men the variation between the cases in which the blood is completely absorbed without giving rise to pain and limitation in motion of the lung, and those cases in which there is marked limitation with the filling up of the sulci of the pleura, the symptoms and sometimes the physical signs suggest that there has been a mild infection. Upon opening some of these cases it is found that the blood is an organized clot. If it is necessary to operate in an effort to free the lung one finds the lung perfectly smooth, as though encased in a serous sac. By splitting up the fibrous coating one separates the lung, enabling it to distend without the impediment of the fibrous membrane. One finds the same condition in the diaphragm, and this can be dealt with in a similar way. In certain cases one finds nothing so gross, though the symptoms may be equally troublesome. Opening the chest, the worst feature found is that of adhesions of the base of the lung to the diaphragm. The limitation seems to be more than can be explained on these grounds. I am inclined to think that a certain amount of the disability is due to the hemorrhage and want of expansion of the lung for a considerable time afterward. The lung becomes more or less permanently retracted, and this is not overcome by the respiratory exercise.

When the foreign body has been localized by the *x*-rays and symptoms suggest some definite organic change in the lung, we feel that we have an indication for the removal of the foreign body. In cases in which there is an unabsorbed hemothorax and the methods used to extend the lung, we feel that thoracotomy is indicated. Sometimes, with less evidence of organic change in the chest, but in which serious disability is produced, we are led to open the chest and deal with the pathological conditions present.

Sir Thomas Myles has described the technic of Sir Berkeley Moynihan. That is the technic fairly extensively employed, but it does not remove the foreign body by the shortest possible route. Upon localization of the foreign body the incision should be made directly over it and a portion of rib removed. Any adhesions present

need not necessarily be separated. A lung obviously adherent gives no rays; you may cut into it and remove the foreign body. If there is evidence of infection the lung may be sewed up and the chest closed without drainage. Any bandlike adhesions present ought to be divided, that the lung may collapse. The foreign body can then be removed in the way described by the previous speaker. It is not fair to speak of these operations as if they were to be lightly undertaken. One cannot forget that many of these men fortuitously recovered from what has been serious casualty, and unless the improvement claimed for the surgical treatment can be carried out without great risk it should not be done. The risk is very small. All the cases have been greatly relieved. In those cases in which the foreign bodies gave rise to very definite symptoms many have been cured. Recovery depends upon the amount of damage to the lung tissue at the time the operation is undertaken. Sufficient time has not elapsed to say what the ultimate history of these cases will be.

In speaking of the result following the treatment of gunshot wounds of the lung, it is not enough to say that the patient can be returned to duty; we must know the condition months or years hence before we can speak with certainty. This is a branch of war surgery not yet sufficiently gone into, but for which the time for such investigation is ripe. The nearer to the battle front can be our first line of surgical defence the better will be the results. The success of thoracic surgery in this war has been a very good indication that the general principles of surgery are true wherever applied.

# GUNSHOT WOUNDS OF THE LUNGS

By Col. Sir THOMAS MYLES
LONDON

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It must never be forgotten that the man with a bullet in his lungs has a bullet in two places—in his lung, and also on his mind. As long as the bullet is on his mind he will never be well. It is to get rid of the bullet on his mind that the second operation is often undertaken. Sir Berkeley Moynihan, who has made a study of this subject, is convinced that the mechanical effect of the bullet in the lung is in many cases comparatively small while the effect upon the man's mind is very large. The only reliable method of examining the lung for the foreign body is that of the *x*-rays. For its removal Sir Berkeley Moynihan finds that with few exceptions an incision at the level of the fourth rib offers an easy method of approach. The lung is to be handled as gently as possible in feeling over it for the foreign body. Having located this, nothing is simpler than to make a little nick and cut down and extract the foreign body. A stitch is then inserted with a curved needle. It is of great importance not to encourage a too rapid inflation of the collapsed lung. To maintain a pneumothorax for about two days would be of great service, because in many cases it is necessary to break down adhesions. I am inclined to think that a further development of lung surgery will take place along these lines, that the raw surface of the pleura may have time to close before the lung is inflated.

[1] Read November 5, 1918.

# THE SURGICAL TREATMENT OF WOUNDS OF THE LUNG[1]

By Major PIERRE DUVAL
PARIS

In the last two years in the French Army the treatment of lung wounds has changed from the medical to the surgical. This surgical treatment consists in excising the lung wound and treating it as one would a wound in any other part of the body. The technic is as follows: Open the chest widely enough to take out the lung; examine it on all its surfaces; check hemorrhage; put back the lung in place and suture the chest wall completely. In the first half of the war in 300 cases of lung wounds treated medically there was a mortality of from 25 to 28 per cent. By the surgical treatment in cases brought in because of severe hemorrhage there were good results in from 65 to 68 per cent. of all cases. By the operative treatment of war wounds of the lung the mortality has fallen from 28 per cent. to 9 per cent.; that means about two-thirds improvement.

The war experience in lung wounds has opened a broad field for lung surgery in time of peace. We hope that it will be possible to treat lung diseases and to handle the lung just in the same way as we have learned to manipulate the intestines.

[1] Read November 5, 1918.

# THE TREATMENT OF CHEST WOUNDS BY ARTIFICIAL PNEUMOTHORAX[1]

By Prof. RAEFFLE BASTIANELLI
ITALY

In the Italian Army the treatment of chest wounds has followed about the same steps as in the other armies. Soon in the summer of 1916 we saw the necessity of an active intervention, and we came to the conclusion that with the exception of a few puncture-like wounds it was necessary to excise the soft parts and to remove the bone fragments, treating the chest wall in the same way as we had learned to treat wounds in any other part of the body, because we felt sure that much of the pleural infection causing empyema, septicemia and death was due to an infection coming from the outside. The chest wall was closed air-tight and without drainage, and generally this operation was performed under local anesthesia, which we found the most safe and sufficient procedure. But we saw soon that the lung wound had to be attended to. But we did not resort to the so-called complete operation as a general measure. It was through the untiring interest of one of my associates, Major Morelli, a pupil of Forlanini, of Pavia, that the artificial pneumothorax was introduced into the Italian Army as a method of treatment of lung wounds, leaving the operation which Col. Gask has called the complete chest operation only for exceptional cases. The question which arises is when to use it and to decide about its indications. We came to the conclusion that even when a similar operation was not indicated there was a real indication for interfering with the consequences which the lung wound

[1] Read November 5, 1918.

produced in the thorax. I must dwell a little on the lung wounds to make clear the principles of this treatment with artificial pneumothorax which I presume is familiar to you in civil practice. Lung wounds are generally such that either they are perforating the lung or incomplete. In every case we say that there is hemorrhage inside the pleural cavity and air is going to the pleural cavity either by the outside or by the lung itself. Some wounds are such that air is not admitted from the outside, neither can it escape, so that the hemothorax and the pneumothorax, are in a closed thorax. In other wounds the chest wall is open, and in this case we speak of an open thorax. When the thorax is closed and there are no adhesions generally we see that the hemorrhage is either fatal, and for these cases we have no resort because the wounded die in the field or during transportation, or it is profuse or moderate, or it is such that at the beginning it does not show; but in time it increases and continues beyond the time one would expect. This kind of prolonged hemorrhage is due to the fact that inside the closed thorax there is the negative pressure of the lung, which works like a suction cup on the lung wound. Each time the chest wall expands there is not only suction exercised on the lung wound, but the lung itself must, even if partially, expand. So there are two conditions which we would call very bad for any wound in any part of the body—a movement of the wounded organ and a suction on the wound itself. The pneumothorax in a closed thorax may have different pressures, as we can verify by testing it with a manometer. When such a closed thorax wound is left alone we see in many cases that Nature may effect a cure, either a perfect, or most commonly, an imperfect one; but a cure comes in many cases, hence the tradition that chest wounds should be treated expectantly. The mechanism of the cure by Nature is through the pressure exercised on the lung wound by the blood in the pleural cavity, by the air or by both together. We do not believe that the blood-pressure on the lung wound is sufficient to check hemorrhage. With 1500 or 2000 c.c. of blood inside the pleural cavity the lung may still expand. The pressure exercised by the air is the most efficient. You have heard from Col. Gask

that in almost all cases he has seen the lung wound was not bleeding and that it was not necessary to resort to any treatment to check hemorrhage because of the collapsed state of the lung. This is due to the pressure exercised by the air when it enters the pleural cavity, as then the lung is totally collapsed and in a complete immobility. In such a case the lung is reduced to a small size and the walls of the lung wound are approximated, or, in other words, the lung wound is mechanically closed. The lung collapsed is immovable and presents a favorable condition for healing. We have learned also that the blood in the pleural cavity is dangerous, because not only is it a culture medium for microörganisms, but if it is not resolved quickly it generally clots and makes fibrinous deposits which obliterate the sinuses of the pleura and produce adherences. Also, the pressure of blood in the pleural cavity does not favor the expansion of the other side of the chest. Instead, if the pleural cavity is filled with air, the lung is compressed, hemorrhage, infection and adhesions are prevented more easily. Even the big missile inside the lung sometimes remains without complication if immobility is maintained, while if the lung is free to expand more or less the foreign body produces more frequently inflammation or abscess. Besides, when blood is in the pleural cavity the lung is usually only partially retracted, and in this position it contracts adhesions with the parietal pleura in areas not anatomically corresponding, so that when, finally, the blood is resorbed and the lung begins to expand the adhesions will prevent it and the lung will never reach the normal situation. Consequently, we see raising of the diaphragm, displacement of the mediastinum of the heart and bad functional consequences. While if the lung is surrounded completely by air, adhesions do not occur, and when the lung begins to expand the pleura viscerally will not contract adhesions so quickly that the expansion is prevented. Adhesions may occur later, but then the lung has already expanded and the function is good. For these reasons we believe there is advantage in removing the blood as completely as possible from the pleural cavity and in substituting air. By removing totally the blood we prevent infection and check hemorrhage. We never see

secondary hemorrhage, and we are sure about the ultimate results, which are very important, for we have not only to reckon with the number of cured and dead but also with the quality of cure, and we may claim that with this method we get the best results. There is no danger in removing the blood from the pleural cavity. It is a current opinion that blood should not be removed because it is a most efficient agent in checking hemorrhage. This is not true if in removing the blood we substitute air in the pleura, inducing a positive pressure sufficient in causing collapse of the lung.

Regarding the indications for pneumothorax, we believe that in every case in which a lung wound is demonstrated, pneumothorax should be performed. We perform it also in cases of contusions of the lung, which are very frequent and more dangerous, as currently admitted, because they often are followed by complications —pneumonia, bronchopneumonia, lung abscess, infection of the pleura. There are naturally contra-indications to the pneumothorax, as when adhesions prevent the introduction of air or when the air escapes through a gap of the chest wall, which we could not close completely, or through the lung wound itself by way of a large bronchus. But this is exceptional. The indications for complete operation in our practice are very limited, and when the chest is a closed one we believe that it should be performed exceptionally; while if the chest is open, and especially if the opening is large, naturally it is more often indicated to inspect and treat the lung wound. We have had no case in which we were obliged to resort to a complete operation for hemorrhage. Instead, we believe that this operation should be performed any time one can demonstrate a foreign body in the pleural cavity, because this is apt to bring on frequently infection.

About the closure of an open chest, we believe that it must be performed as soon as possible, and we found useful to introduce provisionally in the chest wound a small rubber bag, which when inflated with air seals completely the opening. These bags of different sizes, likewise the apparatus for performing safely the pneumothorax, have been devised by Major Morelli, and I will demonstrate its use by lantern slides.

The hospital attached to my unit in which thorax wounds were received was in advanced positions, and by order of authority all chest wounds without regard to their conditions were brought into it and kept until the case was complete. Up to June last we had 370 chest wounds. We exclude 43 in this count, which were not penetrating wounds and 37 which were only lung contusions. Of the 290 penetrating wounds, 206 were wounds of the lung with closed chest, *i, e.*, of the category of chest in which we believe the complete operation is seldom indicated. These 206 cases were treated by pneumothorax alone or by thoracentesis and pneumothorax. Altogether there were seven deaths. Among the cured ones we saw only 22 complications: 9 of pleuritis; 8 of empyema; 2 of pulmonary abscess (1 died); 3 of septicemia (3 died). Of the open chest there were 84 cases with a mortality of 19 cases, or 22 per cent. Of these 19, 8 died in the first fourteen hours. We could do nothing for them when they came in, so it would be fair to consider only the cases which we did treat. Of the 76 treated by pneumothorax after removal of the blood there was a mortality of 11 cases, or 14.5 per cent. Of these, 7 were due to empyema and 4 to septicemia. There has been a great improvement in this series of open chest since my plan of suturing the chest wall air-tight instead of plugging permanently the gap with the rubber bag, was systematically adopted. In 35 cases so treated we had two deaths. I think that these results can compare with any result in any other army by any other means of treatment. I will show by lantern slides the device by which we did all our pneumothorax and the blood-extraction operation.

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## DISCUSSION

Dr. W. W. Keen.—I think this, so far as I know, is the very first occasion in this College when we have ever had the opportunity of hearing from representatives of France, England and Italy, and it is a peculiarly happy occasion that we have these addresses from our three Allies—for I like to call them "Allies," rather than co-belligerents—because of the splendid victories that have come to us within the last ten days. I would

move you, sir, therefore, that the thanks of the College—the sincere thanks of this College—be presented to these gentlemen representing England, France and Italy; and with it I would like to combine also a message to the Surgeon-General of Great Britain, whom we all know here so well, Lieut.-Col. Goodwin, Surgeon-General of all the British Forces, bearing to him our affection and our congratulation on the splendid success of our allied arms.

# APPENDIX

# PROCEEDINGS

OF THE

# SECTION ON OPHTHALMOLOGY

JANUARY, 1918, TO JANUARY, 1919

## JANUARY 17

### Cysts of the Iris in the Right Eye

Dr. P. N. K. Schwenk showed a man, aged twenty-four years, married, with two cysts of the iris in the right eye. One was of a semitransparent color with a few iris fibers crossing its anterior surface, measuring about three-sixteenths of an inch, slightly flattened by contact with posterior surface of the cornea, and situated at 10 o'clock. The other was highly pigmented, having denser iris tissue for its wall and about two-sixteenths of an inch in diameter, occupying 4 o'clock position. The two projected edges were nearly in contact occluding the lower three-quarters of the pupil, therefore interfering with vision. The patient still had most of two-fifth vision with glass correction of $+12$ S $\bigcirc$ $+2$ cylinder axis 90° in aphakial eye. This patient first came under Dr. Schwenk's observation at Wills Hospital on July 13, 1916, when the following history was obtained: When thirteen years old he was struck in the left eye by a ruler in the hands of his teacher which caused blindness of that eye. Several months later a boy threw a stone at him which hit him in the right eye, causing impaired vision.

Examination showed slight convergence of globes, but muscular movements were normal. Both cornea normal. Left pupil 2 mm. and right 4 mm. Left eye media clear, large patch of choroidal atrophy with pigmentation in macular region and vision *nil.*

Right eye pupil 4 mm., slight reflex action, iris oscillating, lens dislocated up and out, at 10 o'clock, slightly swollen, T +. S.—3 = 6/15 vision. November 11, 1916, returned with deep ciliary injection, cornea steamy, keratitis punctata, pupil widely dilated, T + l., fundus reflex but no details. Alternatives were given and he was advised to have the lens removed, but he desired to go home and consult his family.

December 5, 1916, the patient returned with the ball less injected but having a glaucomatous expression. In consultation with Dr. Zentmayer, removal of dislocated lens was confirmed. Punctate deposits on posterior wall of cornea were pronounced and T +2. The patient was admitted to the ward of the hospital and ordered to be prepared for operation two days later. On December 16, 1916, general anesthesia was given when the lens was removed after an iridectomy. Some of lens cortical remained, but it was deemed advisable not to attempt its removal. The patient made an uneventful recovery and was discharged on December 20, 1916, with vision of 20/50 with a +12 S ⌔ +2 cyl. ax. 90° glass. December 1, 1917, nearly one year after lens extraction, patient returned with a clear cornea, broad iridectomy, at 12 o'clock, some unabsorbed cortical still present. Anterior chamber normal, eye quiet, some opaque capsule. Advised to return for capsulotomy. Iodides were given. May 28, 1917, a web-like opacity showed in pupillary area but eye quiet.

October 9, 1917, patient returned with a large cyst of iris, at 4 o'clock, and a smaller one at 11 o'clock.

On October 11, a broad needle or keratome was passed from 4 o'clock, at limbus of cornea into cyst, point of needle extending through cyst wall into pupillary area evacuating contents of cyst. With a Tyrrell hook the cyst wall was engaged and cut off. When Dr. Schwenk looked for the other cyst it had collapsed and could

not be found, showing that there must have been a common wall connection.

Cysts of the iris are very rare, and Dr. Schwenk considered the case of sufficient interest to show before the section. The cause is supposed to be an invagination of epithelium caused by trauma or operation.

## Recurrent Pterygium

Dr. J. B. Turner showed a man, aged forty years, who had during a period of ten years, eleven operations for recurrent pterygium. The conjunctiva of the lids becoming involved, the eye was enucleated six months ago, and there has been no return of the disease which the pathologist classed as a slow-growing carcinoma.

Dr. Zentmayer, discussing Dr. Turner's case, said that malignant growths starting from pterygia were rare but not heretofore unknown. It would seem probable that in these cases there is an element of malignancy latent which is excited to activity by the operation for removal of the growth.

## Orbital Tumor

Dr. Wm. Campbell Posey presented the notes of 3 cases of orbital tumor. Case I was that of a woman, aged twenty-seven years, with marked exophthalmus in the right eye, the exophthalmus which had appeared when the patient was about seven years old, being caused apparently by a hard, smooth mass, which could be plainly felt under the orbital rim at the upper, outer part of that cavity. Notwithstanding the displacement of the globe, ocular movements were good in all directions. Vision in the right eye was normal and there was no limitation in the field of vision. X-ray examinations of the sinuses negative. Incision made over the most prominent portion of the mass gave escape to a large quantity of thick viscid material, the mass evidently being of a dermoid nature.

Case II.—Dr. Wm. Campbell Posey presented a case of sarcoma of the orbit in a man, aged fifty-four years, who had been struck on the head and eye some ten years previously by falling timber. The affected eye had been enucleated elsewhere some four years previously, perhaps for sarcoma of the choroid, though the cause of blindness in the organ and the reason for its removal were unobtainable. The recurrence of the growth in the orbit, if such was the sequence, presented an unusual form, the tumor appearing as a firm black rounded mass, which occupied the position of the eyeball and extended downward and forward, resembling in its position and form a microphthalmic eye with attached cyst below. The mass was removed *in toto* by Dr. J. Milton Griscom in the absence of Dr. Posey, and the contents of the orbit eviscerated. Copious hemorrhage attended the operation and recurred at each dressing. Two weeks after the operation the orbit was subjected to a thorough electrical desiccation treatment by Dr. Clark, since which time the hemorrhages have ceased, and the orbit now shows signs of being filled in with newly formed tissue.

Case III.—Female, aged eighteen years. Following an attack of typhoid fever when aged twelve years, glands upon the back part and upon the left side of her neck became swollen. This condition has persisted ever since. Health otherwise good. Family history negative. About a year ago noticed that the left eye was more prominent. This condition advanced until four months ago, when the protrusion of the eyeball became stationary. Upon examination, left eye is moderately proptosed down and somewhat out. Under the upper, outer part of the orbit a firm, slightly movable mass is felt, about the size of a large almond. Ocular movements limited, but no neuritis. X-ray examination of the sinuses negative. Incision made in upper, outer part of the orbit, just over the mass, revealing a more or less oval, firm encapsulated growth, easily removable and without connection to any important intra-orbital structures. Rapid convalescence with slight scarring. Macroscopic appearance of growth suggests sarcoma. Microscopic report not yet received.

Dr. Shumway said that in exenteration of the orbit in 2 cases at the Philadelphia General Hospital, one for recurrent carcinoma of the anterior part of the eyeball, and the other for sarcoma of the choroid, with extension into the orbit through the sclera, he had asked a member of the *x*-ray department of the hospital to be present at the operations. After removal of the orbital contents the remaining tissue at the bottom of the orbits had been charred by the application of the desiccation spark, and no recurrence has been noted. In one case bleeding from the ophthalmic artery had been controlled by passing the current downward through the hemostatic forceps, which had been placed upon the cut vessel, and there had been no subsequent bleeding. He thought the method made the operation easier, and helped to prevent recurrence.

## Variable Findings in Ocular X-ray Localization

Dr. G. Oram Ring presented for study a man who had been struck in the left eye with a piece of steel ten weeks ago, the case applying at the Protestant Episcopal Hospital for treatment about five weeks after the accident to the eye.

The vision in O. D. is 20/25 and in O. S. 20/150.

At the time of the initial examination the eye was white and quiet, with evidence suggestive of penetration of the ball at two different points, a small central opacity at the pole of the cornea with a corresponding spot on the lens capsule with traumatic cataract and a second linear corneal scar down and in, with corresponding penetration of the iris just below the lower and inner pupillary border which was the site of a broad posterior synechia. No satisfactory view of the fundus could be made because of the lens haze. Perception and projection were good. Upon strong illumination of the good eye, slight lacrimation was present and there was some obscuration of the upper, inner and lower edges of the disk.

An immediate *x*-ray showed the presence of only one foreign body, which was located 28 mm. behind the corneal pole, 3 mm.

to the nasal side and 2 mm. above the horizontal plane, approximately in the position of the optic nerve.

Inasmuch as the sensitiveness of the right eye rapidly subsided, and assuming that the foreign body was behind the eyeball, it was proposed to wait until the foreign body had probably firmly incased itself in exudate.

At the end of about two months an upward iridectomy was done with the intention of later extracting the lens. The view thus made possible through the lens periphery showed the presence of a small mass of exudate in the posterior part of the vitreous with a dark center which immediately suggested the importance of a second *x*-ray picture. This was made by Dr. H. K. Pancoast of the University of Pennsylvania. Still but one foreign body was located, but this time in the eyeball 21 mm. back of the pole of the cornea and 3 mm. to the nasal side and $2\frac{1}{2}$ mm. above the horizontal plane.

In view of this second finding it was determined to proceed no further with operative intervention unless suggested by sympathetic symptoms.

This is the second case within a year that the author has been led astray by faulty localization, although it must be kept in mind that the clinical appearance pointed to the presence of two foreign bodies, whereas the *x*-ray plate in each case indicated one but in different positions.

Dr. Ring's experience with the *x*-ray localization by the "Sweet Method" on the whole has been most satisfying and he proposes to have further *x*-ray studies in the hope of shedding additional light upon this rather unique case.

Dr. S. Lewis Ziegler spoke of the possibility of having two foreign bodies in the same eye, only one of which showed on *x*-ray examination. He spoke of having seen such a case with cataract and siderosis, in which pain was elicited on application of the magnet. Upon operation a foreign body was removed with the lens, and a second foreign body extracted with the magnet through an incision over the ciliary body.

## Vernal Conjunctivitis Greatly Improved by Radium Treatment

Dr. Edward A. Shumway reported the case of a boy, aged eleven years, who came to the Eye Dispensary of the University Hospital in the service of Dr. G. E. de Schweinitz, in November, 1912. Examination showed a very pronounced case of vernal conjunctivitis of the palpebral type. Various mild antiseptic solutions were used, with but little effect. Some of the masses were excised, and the lids were once thoroughly rolled, but no improvement resulted. In July, 1913, he was sent to the Oncologic Hospital and applications of radium were made by Dr. Wm. E. Newcomet. Eleven treatments of an hour's duration each were given to the right eyelid, the amount employed being 11 mg. No reactions occurred, but no effect was apparently produced, except that the eyelashes fell out. Two years later it was noticed that the masses seemed to coalesce into a smaller number of very large masses. In February, 1917, it was decided to have radium treatment tried again because of the successful results that had been reported by F. W. Shine, of New York. The boy was sent to Dr. Henry K. Pancoast at the University Hospital who had control of larger quantities of radium. Five applications to the left and four to the right lid were made in a period of four months. The amount varied between 35 and 50 mg. and the time of exposure was fifteen minutes at each session. In November, 1917, he reported at the eye dispensary and the growths were found to have completely disappeared. Except for a superficial roughening of the conjunctiva, due to scar tissue, the patient can be said to be cured, though he will be watched for a possible recurrence during warm weather. The case was the most elaborate of its type that Dr. Shumway had seen and the result had been most gratifying. He thought that radium may be considered a very valuable aid in curing cases of vernal conjunctivitis of the palpebral type which had resisted other treatment. The general experience has been that occasional applications of large doses—preferably 25 to 35 mg.—for periods of fifteen minutes, at intervals of two to four

weeks are most efficacious, and that reactive inflammations may be prevented by suitable protection of the adjoining parts.

Dr. Zentmayer said that the literature contains the reports of many cases of vernal conjunctivitis cured by the use of radium. Butler and MacKenzie Davidson report a considerable number and seem convinced that in radium we have a specific for this annoying affection. One of the earliest reported cases of vernal conjunctivitis treated by *x*-rays was one treated by Dr. Sweet at Dr. Zentmayer's suggestion. While he did not know whether it was a cure, he recalled that there was no recurrence the following two summers.

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## FEBRUARY 21

### Tumor of the Orbit

Dr. Posey exhibited a case from whom he had recently removed a tumor of the orbit. The growth had occasioned marked exophthalmos, the globe being proptosed 11 mm. in front of its fellow. The incision was made as for the Krönlein operation, but the tumor, which consisted of an adenoma the size of a horse-chestnut, was removed without interference with the bony wall of the orbit. Convalescence had been speedy, and now, three weeks after the operation, there was scarcely any evidence of the previous existence of the growth beyond a slight drooping of the outer part of the lid.

### Blindness from Ischemia of the Retina

Dr. Arnold Knapp, by invitation, reported on a number of unusual cases illustrating a definite group showing occlusion of the central retinal artery in which a cause cannot be found; this group is said to constitute about 30 per cent. of the cases. In addition to these a case of embolism of the central retinal artery was reported occurring in a child, aged ten years, who had suffered from acute rheumatic endocarditis.

The following cases constituted the subject of the paper:

Case I.—Embolism of the retinal artery in a child, aged eight years, who suffered from chorea.

Case II.—Two cases of frequent obscurations which led to a permanent occlusion of one of the branches of the retinal artery. In both of these a most careful general medical examination was made without finding any definite cause, except in the first an anemia secondary to pulmonary tuberculosis and in the second six abscessed teeth.

Case III.—A temporary obstruction of the retinal circulation which was observed during an attack. The cause for this seemed to be an anomaly of the vessels at the optic disk and a momentarily reduced general blood-pressure.

Case IV.—Two cases of closure of the central retinal artery with loss of sight of unquestionably infectious nature. In the first a patient, who suffered from chronic streptococcus viridans septicemia, lost the sight in one eye with the picture of an obstruction of the retinal artery with some exudates and hemorrhages in the retina. In the second case the infection was obscure and both eyes were affected, one after the other, with subsequent and total blindness. The ocular diagnosis being a retrobulbar neuritis with involvement of the central retinal artery. The optic nerve head showed distinct inflammatory changes; there was a central scotoma in the right eye, retinal exudates and a shutting off of the retinal circulation. This patient who also suffered from endocarditis, originally had an operation upon her antrum and had been running a regular evening rise of temperature for months.

Dr. Zentmayer said he feared that he could not say anything in elucidation of the group of interesting cases Dr. Knapp had reported. He had at that time at Wills Hospital a case that belonged to the first group, that is, those occurring in children. The patient was a boy, aged twelve years, who suddenly lost the vision of his right eye. At first there was the picture of complete obstruction of the trunk of the central artery due doubtless to an embolus, as the boy has a valvular lesion of the heart. After a few days there appeared along the course of the inferior temporal

vessel a large patch of exudative retinitis. It would seem probable that the embolus broke up and was carried into the branch and that it was septic. Many present probably recalled seeing Dr. Harbridge's case of spasm of the central artery of the retina in a man, aged fifty years. These attacks followed stooping and recurred on two successive days, lasting from thirty seconds to two minutes. The attacks ceased after the use of free purgation and a nitrite of amyl. It was likely that the cause of the spasm of the vessel was an auto-infection just as in uremia we have a spasm of the cerebral vessels. Given the early changes of arteriosclerosis in the retinal circulation with superadded a low blood-pressure and you have favorable conditions for the formation of a thrombus.

The condition of ischemia of the retina as a complication of mumps suggest the possibility of this being in the nature of the recently described symptom-complex of uveoparotitis in which a uveitis sometimes precedes, sometimes following the parotitis, in the first instance it being a question whether both the uveitis and the parotitis are not due to a common toxic cause. It might be that the obstruction of the central artery was of a metastatic type.

Burton Chance, in commenting upon Dr. Knapp's paper, detailed a case of widespread retinal ischemia in the left eye of a woman in the sixth month of her fifth pregnancy, prior to which her sight had been unaffected. The ischemia involved the area supplied by several branches of the central vessel, as depicted in a sketch he showed made by the late Miss Washington. The case went to term safely, but after three months the circulation was found to have become completely restored, and the sight as before the sudden loss. In addition, Captain Chance referred to the frequent inconsistency between the degrees of intracranial vascular pressure and the appearances of the retina. He recalled cases of superturgid cerebral vessels as found postmortem, in which at no time up to within a very short period before dissolution were there evidences of abnormal vascularity within the globes. In this connection he had in mind the findings in a number of fatal cases of cerebro-

spinal meningitis which had been under his observation in the recent epidemic at Camp Jackson.

Dr. Ziegler suggested that some of the cases of spasm of the retinal vessels may be due to disturbances of the parathyroids, and stated that he had seen a case of spasm which he considered due to this cause.

### Concussion of the Eye and Removal of Two Bullets from the Orbit

Dr. Howard F. Hansell reported a case in which two bullets fired from an air rifle, the one round and the other ragged and smaller, struck the eye on the nasal side, tore the conjunctiva, lacerated the internal rectus muscle and entered the orbit. The only intra-ocular change was a partially dilated and slowly reacting pupil. Objects were indistinct and seemed to be unsteady. The foreign bodies were dissected from the tissues on the nasal side of the ball and extracted.

The eye perfectly recovered its mobility and vision.

### Perforation of the Cornea Persisting for Eight Months

Dr. Hansell spoke of the case of a nurse who contracted gonorrheal ophthalmia in the right eye while nursing a patient. Ulcer of the cornea and perforation followed. By May, four months later, the inflammation had subsided and the conjunctiva had regained its normal thickness, but the perforation had not healed. In January, 1918, the perforation still remaining open, a flap of conjunctiva was drawn over it and sutured. The anterior chamber was restored in twenty-four hours.

The unusual and interesting feature is the long-continued annihilation of the anterior chamber without infection or injury of any kind to the tissues posterior to the cornea.

Last year Dr. Zentmayer showed before the Section a woman who had had a corneal fistula for nine months. Closure was brought about by means of the Kuhnt kerato-conjunctivo-plasty.

As in most of these cases an iridectomy is necessary, the blade of the keratome may be kept within the anterior chamber and used as a support upon which to curette the fistula.

Burton Chance said Dr. Hansell's cases of persistent perforation of the cornea brought to his memory several cases of tardy closing of the wound after cataract extraction of which he had had the care when resident at Wills Hospital. At that time, when he saw so frequently purulent infection after wounds of the globe, he had wondered how so long a delay of closure was not accompanied by suppurative processes.

Dr. Ziegler called attention to the fact that he had previously related a case of corneal fistula of long standing that had been successfully closed by a corneal transplantation.

## Opticociliary Vessel

Dr. A. C. Sautter exhibited a case of congenital opticociliary vein in the right eye of a man, aged thirty-three years. There was no history of any previous ocular inflammation, excepting a mild traumatic conjunctivitis about sixteen years ago.

Vision in the right eye equalled 5/6; in the left 5/5. The anterior ocular segment of each eye appeared free from any abnormalities.

Ophthalmoscopic examination of the right eye revealed clear media, a nearly circular healthy disk with a small, slightly eccentric physiological excavation. At the upper temporal border of the disk a cilioretinal artery was visible and at the lower temporal portion could be seen a vessel running apparently from the papillary vein outward and downward over the papilla to the disk margin where it abruptly disappeared. It was somewhat wider than the cilioretinal vessel present above, its widest portion being at the disk margin. In color it resembled an artery more than a vein but showed no vessel reflex. This vessel was crossed at about its inner third by a very small branch of the papillary vein. There was slight pulsation of the retinal veins where they entered the excavation but no pulsation of the anomalous vessel. Pressure upon the eyeball caused increased pulsation of the retinal veins

with a blanching of the venous structures within the excavation including the central portion of the anomalous vessel, pulsation of which, however, could not be proved with certainty.

Otherwise the fundus showed no abnormal changes and nothing unusual was noted in the fundus of the fellow eye. Refraction in each eye was a low hypermetropic astigmatism.

The writer was able to find in the literature but 12 cases of this congenital anomaly, 2 of which were arteries. These cases have been generally attributed to congenital dilatation of one of the capillary anastomoses normally existing between the retinal and ciliary circulations. The writer's case resembles closely the case reported by Shoemaker in 1909, the relative location, size and color of the vessel being the same. While pulsation is absent, it apparently communicates with a retinal vein. The collapse of the vessel in conjunction with other venous branches upon pressure on the globe would seem conclusive evidence in favor of considering it part of the venous circulation, but whether the direction of the blood stream is the same as in the retinal veins seems impossible to determine with the ordinary methods of examination.

## Essential Atrophy of the Iris

Dr. William Zentmayer reported the case of A. B., aged twenty-three years; spinner, of Polish parentage; parents living and well; two brothers, three sisters living and well; seven brothers and sisters dead, all in childhood. The patient was poorly nourished; had measles when seven years of age; no other illness except carbuncle three years ago. Suffered severe headaches about every three weeks. Seven or eight months ago he noticed halos around light only at night. Since fall the sight had been foggy in the morning. No pain. The eye was never inflamed. Never wore glasses. Wassermann, negative. Von Pirquet, strongly positive. Vision: R. E., 5/5; L. E., $-0.75 \bigcirc -2.00 \times 90° = 5/8$. Tension: R. E., 18 mm.; L. E., 30 mm. R. E., fundus normal; L. E., cornea hazy, no fundus changes. Field was full for form

but the color fields were contracted. R. E., cornea hazy. The iris presented in its nasal quadrant a partial atrophy of its stroma, but as yet there were no holes.

In 1913 Dr. Zentmayer exhibited before the Section a similar case in a woman, aged twenty-three years, in whom the atrophy advanced in the short time the patient was under observation (seven months) from a few small holes to an almost complete destruction of the nasal half of the iris. In 1915, before the American Ophthalmological Society, de Schweinitz reported a case almost identical with Dr. Zentmayer's first case and referred to two other very similar cases, one by Wood and one by Harm. In his own case the patient was a female, aged twenty-three years, who presented a low nervous resistance probably due to tuberculosis. In commenting on Zentmayer's suggestion that the changes were probably due to alterations in the vessels, Dr. de Schweinitz said that no explanation was offered as to the nature of these changes or how they brought about the atrophy. He offered as a possible explanation the action of an autotoxic agent. In the first number of the *American Journal of Ophthalmology* Feingold records the pathological findings in a case somewhat like these. He found slight infiltration and pigmentation around Schlemm's canal. The defects in the iris were limited to its ciliary portion and consisted of atrophy of all of its layers and degenerative changes in the bloodvessels. In explanation of these alterations his thoughts turned to possible embryonic malformation of the vessels. As in Wood's case there was cavernous degeneration of the optic nerve. In a small area of the retina, on the temporal side of the papilla, there were large cells occupying the position of the ganglion cells. Their nature was not determined. He concludes that his case offers no positive explanation for the clinical entity although some features could be interpreted that a congenital vascular disturbance in the neighborhood of the smaller circle may have induced the changes in the iris.

## Zonular Opacity of the Cornea

Dr. William Zentmayer presented the case of G. B., aged sixty-two years, painter. No personal or family history bearing on the present eye condition. Last spring on being tested for glasses he discovered that with the right eye he could see only the outer half of an object looked at. The eye had never been inflamed nor painful but occasionally watered. For the past five weeks he had noticed an increasing dimness of vision in the left eye. Vision: R. E., blind; L. E., 5/6. Tension: R. E., 50 mm.; L. E., 12 mm. The R. E. presented a dense opacity extending horizontally across the lower third of the cornea with a temporal and nasal upward extension on either side of the pupil. The overlying epithelium was roughened and in places vesicular. The iris was bound down to the anterior capsule of the lens, was discolored and had large blood-bearing vessels crossing its surface at right angles to the radial fibers. The cornea was anesthetic. In the left eye there was a zonular band symmetrical with that in the right eye but much less dense and the overlying epithelium still uninvolved. By oblique illumination the opacity was almost ground-glass in density and was uniform except for a small, comparatively clear spot near the middle. The sensibility of the cornea was diminished. In other respects the eye was normal.

An interesting feature of this case was that in one eye the opacity was associated with an iridocyclitis with secondary glaucoma and blindness, whereas the other eye, aside from the opacity, appeared normal. From this it was difficult to say what was the sequence of events in the first eye. Possibly in this eye the opacity was secondary. In the second eye it would appear to be a senile dystrophy.

According to Fuchs this is the most common of the corneal dystrophies. He recognizes two forms, one secondary to destructive iridocyclitis and glaucoma, the second as a senile primary corneal condition. He has also observed it resulting from the long-continued impact of fine forming particles against the cornea of traumatic origin. The opacity begins near the limbus on either

side of the cornea in its lower third and progresses toward the middle so that the portions toward the limbus are always more extensive and at first the central part of the cornea may be uninvolved. Under magnification it is found to consist of minute dots lying beneath the epithelium, the latter often being shagreened. Histologically the opacity consists of minute calcareous particles. Where these are the densest there is new-formed connective tissue which may either extend toward the surface, causing the unevenness of the epithelium seen clinically, or posteriorly breaking through Bowman's membrane.

## Ophthalmic Miscellany in Connection with the First Draft Men at Camp Jackson

Captain Burton Chance presented a résumé of his study of men of the National Army assigned to Camp Jackson, Columbia, S. C., and described their physical and social characteristics. The men, white and black, came largely from the Carolinas and Florida. He gave an analysis of the cases of disease or deformity which, together with visual defects had been proscribed by the Government as sufficient to disqualify for the service.

Dr. Hansell said that the examination of the eyes of registrants by him, as a member of the Advisory Board of the Jefferson Hospital, had been difficult by reason of his desire to comply with the rules governing acceptance or rejection and his own ideas of the needs of the Government. The rejection of men whose vision was less than 20/100 and 20/40 meant the loss of many men who were eligible for almost any branch of the service. The Advisory Board was requested to assign men for selective service, yet the rules for the standard of vision absolutely prevented any choice by the Board. No provision was made for the *careful* examination of men and so they were unable to tell in many cases whether vision could or could not be improved to the standard. The standards were entirely too high. If the Advisory Board was to have any selective power, and if the Board was made up as it was supposed to be, of experts in the various lines, the Board itself should set the

standards. For example, a man is to be rejected because he has a progressive ocular disease: vision so bad that he can only earn his living as a laborer; an infectious disease; recurring inflammation and the possibility of sympathetic ophthalmia; or may become invalided because of his eyes. All others should be accepted either unconditionally or for selective service.

Dr. Posey said that as an officer of one of the local draft boards since the commencement of the war he was satisfied that the visual standards as now laid down by the Government were excellent, and that a soldier could not possess safely less than 20/100 vision in each eye, for with a lesser degree of visual acuity it would be impossible to escape accident in many situations in which a soldier would necessarily find himself. He called Dr. Hansell's attention to the fact that there were no specialists among the medical examiners of local boards, and that the Government had appointed the Medical Advisory Board for all kinds of special examinations. The oculists on such boards must be prepared to weed out malingerers, and in case of need to bring the vision in one of the eyes to 20/40 as per instructions from Washington. The work, then, of the medical advisory boards was of the greatest importance and could not be underestimated.

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## MARCH 21

### Tumor of the Orbit

Dr. William Campbell Posey exhibited a man, aged thirty-five years, from whom he had removed a large fibroma of the orbit four weeks previously. The growth, which resembled in size and form a large myopic eye, was situated back of the eye superior to the optic nerve, though not in connection with it, and had proptosed the eye 12 mm. in advance of its fellow. The displacement of the eyeball was first noticed by the patient six years previously and had been slowly progressive. Vision was but little affected, though the movements of the globe were considerably impeded.

The tumor was removed through an incision made at the outer angle of the orbit, with the intention of performing a Krönlein, if such procedure were found necessary. The delivery of the mass was effected, however, without resection of the bony wall of the orbit. Recovery had been prompt, though there is still some exophthalmos and restriction in motion of the eyeball. Dr. Posey thought that time would gradually in large measure overcome both of these conditions.

## Optic Nerve Lesions Following Measles

Dr. Posey read the notes of 2 cases where inflammation of the optic nerve supervened immediately after an attack of German measles. In the first case, a man aged thirty-two years, the axial fibers of the right optic nerve were alone affected, as evidenced by a slight diminution in vision, a lowering of the light sense, and the presence of a central relative scotoma. The temporal half of the optic nerve of the affected eye was grayer than normal. The left eye was unaffected. Although there was a family history of glaucoma, there were no symptoms of this disease. Examinations of the accessory sinuses of the nose were negative. An *x*-ray examination revealing an abscess of one of the teeth in the left upper jaw, the removal of the tooth was advised, but this procedure seemed to have no influence upon the neuritis.

In the second case, that of a boy, aged sixteen years, the toxins of measles had produced an inflammation of much greater intensity, the entire head of the left optic nerve exhibiting marked papillitis, with marked involvement of the retinal vessels, the veins especially being swollen and tortuous, giving rise to the suspicion of thrombosis. As has been observed by others in similar cases, vision was but little affected, *i. e.*, $5/7\frac{1}{2}$. The visual field was normal, save for a relative central scotoma, probably accounted for by a few fine hemorrhages in the macular region.

Dr. Griscom spoke of a case of intense double optic neuritis following measles which he had reported in 1911. The patient made a complete recovery both as to vision and fields, although

the nerve heads remained very pale. He reviewed the literature on the subject up to the time of the report and found only 23 cases of blindness due to optic nerve lesions following measles, all but three of which came under the head of optic neuritis. These cases could be divided into three classes: (1) Those showing evidences of primary cerebral involvement with secondary optic nerve change; (2) those showing meningitis as the most prominent symptom with consequent optic neuritis, and (3) those showing optic neuritis without any other local or general symptoms.

### Associated Action between a Paretic External Rectus of the Left Eye and the Masseter Muscle

Dr. Posey also exhibited for his colleague, Dr. Schwenk, a man, aged thirty-four years, who showed a curious contraction of the paretic external rectus muscle of the left eye, when the masseters were thrown into activity by the act of biting. In monocular fixation and in associated movements, it is impossible to rotate the left eye outward but slightly beyond the median line. Synchronous, however, with a firm contraction of the masseters, the external rectus regains its power, contracts and rotates the eye outward almost as though it had regained its normal stimulation.

There was a history of a severe head injury twenty years before, in consequence of which the left Vth, VIth, VIIth and VIIIth nerves had been paralyzed. The recovery from the facial palsy is now nearly complete but there is a marked drooping of the left lid, due to secondary contraction of the orbicularis, not infrequently seen after facial palsy. Dr. Posey said that both Dr. Schwenk and himself were of the opinion that the phenomena above described was to be accounted for by some peripheral union between the Vth and VIth nerves, and exhibited a diagram prepared by one of his assistants, Dr. W. W. Watson, who offered a hypothetical explanation of the manner in which such a connection might occur, viz., from the inferior maxillary nerve, through the otic ganglion, Meckel's ganglion, to the VIth nerve. Dr. Spiller, to whom they had referred the case for neurological study, concurred in general

with their views, but stated that recent anatomical investigation had shown that while Meckel's ganglion sends fibers to the cavernous plexus, and also sends fibers through the sphenoidal fissure to the orbit, it is not stated that the latter fibers communicate with the abducens. The abducens, however, receives fibers from the cavernous plexus. He cited as an example of peripheral associated movement, that when the facial nerve is cut and anastomosis is made between the peripheral end of the facial and the spinal accessory nerve, recovery results in associated movements, attempt to move the face causing movement of the shoulder. Dr. Spiller said: "It is probable that the trigeminal nerve recovered fairly rapidly, before any regeneration occurred in the abducens. Some of the fibers from the third division may have wandered into Meckel's ganglion, and from here to the abducens. The route is circuitous, but it is largely in bony canals, and wandering nerve fibers of the trigeminal might take any course. As they approached the abducens they might have been attracted to it. The views of Ballance and Stewart are no longer held in full by most investigators, but it is probable that the neurolemma nuclei of the peripheral end of a degenerated nerve exert an influence on the young axis-cylinders growing from the central end. As probably no such axis-cylinders were in the adducens nerve at the time of regeneration of the trigeminal nerve, the young axis-cylinders of the trigeminal nerve if they approached the abducens nerve probably would be attracted to it."

Dr. Posey referred to cases of associated movements between the eyelids and the eyeballs in conjunction with certain movements of the jaw of congenital origin, with which all are familiar, but stated that so far as he was aware, the association of movements after trauma had never been reported before.

### Occlusion of Central Artery of the Retina

Dr. F. Krauss presented a case of occlusion of the central artery of the retina of the right eye in a fifty-eight-year-old man. A small section of the retinal artery was discernible on the disk, otherwise

there was no evidence of its existence. The veins were full and tortuous, with innumerable hemorrhages throughout the field. The vision six weeks after the onset was 3/60, which is remarkable considering the fundus change.

### Angeoid Streaks in the Retina

Dr. Charles R. Heed exhibited C. J., male negro, aged twenty-eight years.

Ophthalmoscopic examination: O. D., media clear, optic disk and retinal vessels normal. The temporal half of fundus, extending from the disk margins in a radial direction for a distance of four diameters, presents retinochoroidal changes of an unusual type. The color is grayish, presents a few pigmented areas and numerous hemorrhages lying in the deeper retinal layers. Many deeply pigmented branching streaks running beneath the retinal vessels are noted. These streaks appear to come into direct contact with many of the hemorrhages and converge to the pigment area about the disk. There are a few hemorrhages seen in the nasal field with several of the streaks converging to the disk margins. The general nasal and entire peripheral portions of the fundus appear normal.

A dense capsular opacity obscures the fundus of the left eye.

### Apparent Accommodation in Aphakia

Dr. William Zentmayer reported a case in a girl, aged eight years, with acquired cataract. Two needlings were fruitless in securing absorption, so that for the third and final operation a broad needle was introduced through the cornea into the lens at the site of a capsular rent and immediately vitreous came through into the anterior chamber, leaving a clear opening about 2 mm. long and 1 mm. wide surrounded by opaque lens matter. Through this opening she has 5/5 and reads Type 0.50 fluently to within 3 mm. of the cornea.

Dr. Zentmayer pointed out that more than a century ago Young had noted this apparent accommodation in aphakia and that

Donders tried to solve the phenomenon by observing whether a change took place in the form of a distant light during convergence. He concluded that "in aphakia not the slightest trace of accommodative power remains."

The fact remains, however, that aphakic eyes do at times possess the power of reading at varying distances from some vicarious accommodative power. Among the explanations offered are: corneal astigmatism, increase in the index of refraction in the media, partial regeneration of the lens, cutting off the circles of diffusion either by contraction of the pupil, nipping of the lids or by a stenopeic opening in the capsule, lengthening of the optic axis by contraction of the external muscles, forward bulging of the anterior surface of the vitreous or an increase in the corneal curvature by contraction of the external muscles, spherical aberration, through adjustment of the spectacle lens.

Dr. Zentmayer assigned as the cause in his own case the stenopeic opening in the capsule and lens matter.

Dr. Ziegler said that the cases he had observed of this condition were due either to the action of the extra-ocular muscles on the globe or to nipping of the lids, and also that such cases were those with a correction of +13 D or more, with a very small amount of astigmatism.

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## APRIL 18

### Buphthalmia

Dr. Luther C. Peter reported the case of an Italian child, five months old, who was first seen when one week old, when the conditions were about the same as now seen.

Both corneæ were large, 15 mm. in diameter, bluish in color, with central opacities. The sclera was bluish in color and as a rule free from redness. The anterior chamber was very deep, as the mother said, "the pupil was too far back." The pupils were large even when under the effect of eserine. The iris was normal in

appearance, and fundus details were not obtainable. Tension was increased. The child had good light perception and apparently good projection.

In the family history it was interesting to note that one brother, now six years old, had a similar condition at birth. The left eye was removed when one year old and the right now is sightless and in an irritable state, although not painful. There is a distant relationship between the parents—cousins three times removed.

Although the mother's Wassermann was negative, the treatment had consisted in mercurial inunctions and a weak yellow oxide salve and eserine locally. The corneæ are now clearer than after birth and the eyes are less sensitive to light.

### Probable Intra-ocular Tuberculosis

Dr. Peter detailed the history of a case of intra-ocular growth.

Catharine G., aged eight and a half years, the fourth of five children. Had measles one year ago, otherwise was a healthy child. Five weeks ago the mother accidentally discovered that the child was blind in the right eye. Never complained of pain. Admitted to the Samaritan Hospital a few weeks ago. Examination showed normal pupillary responses and the external appearance of the eye was normal. When the pupil was dilated, however, by oblique illumination, a grayish-white mass was found midway between the lens and the posterior pole of the eye down and to the outer side. Projecting out and to the nasal side was a thin semitransparent exudate in the vitreous body. This prolongation was fan-shaped and had the appearance of a cactus-like growth. There were numerous fine opacities of the vitreous and a red reflex was obtainable up and to the nasal side. The child apparently did not recognize even hand movements at any distance. Transillumination was fairly good through this opaque mass. Bloodvessels were not visible at any time. No fundus details were obtainable by means of the ophthalmoscope. The Wassermann was negative and the general physical examination showed a practically normal child. The tuberculin test was slightly positive, but not decidedly so. There

was a slight tendency to a rise in the temperature after the injection of $\frac{1}{10000}$, $\frac{1}{5000}$ and $\frac{1}{2000}$ of a milligram of T. R. Mulford No. 1. She received hot packs daily but there was apparently no improvement until after the administration of the tuberculin. During the last two weeks, a fundus glare has been visible over a larger area and the child now sees hand movements at 2 feet and occasionally a retinal vessel can be dimly outlined.

The diagnosis has been in doubt. The age of the patient, the appearance of the growth, the absence of the vessels, and the apparent improvement have practically eliminated glioma as an etiological factor. The slight positive tuberculin reaction and the apparent improvement since tuberculin has been administered have tended to confirm Dr. Peter's suspicions of the tubercular character of this condition. Retinal detachment and cysticercus can be excluded.

Dr. Zentmayer said that he had had the opportunity of seeing the case through the courtesy of Dr. Peter when it first came under Dr. Peter's care. The age of the patient, the minus tension, the absence of a tumor mass and the history that it followed an attack of measles made him suspect that it was a case of detachment of the retina of the class first described by Nettleship or that it was one of tuberculosis.

Dr. Hansell said the morbid process now apparent in the vitreous bore no resemblance to either glioma or pseudoglioma, although when it was in the formation stage those two affections were worthy of consideration in determining the diagnosis. The latter has been reported as a sequel of the exanthematous fevers. When present it leads to rapid destruction of the intra-ocular tissue. Here there was a most unusual, probably fibrous formation in the vitreous, the origin of which was difficult to determine.

### Small Growth from Ciliary Body following Cataract Extraction

Dr. G. Oram Ring reported the case of Mrs. R., aged fifty-four years, who was operated upon seven years ago for cataract. A

combined extraction, with later secondary incision of the capsule being the procedure adopted.

She presented herself on July 11, 1916, and the cataract in O. S. was extracted by one of Dr. Ring's colleagues.

During visits for the examination and treatment of O. S. it was noted that a minute growth lying on the opaque capsule of the right eye apparently proceeding from the ciliary body out and down and was pressing the iris forward slightly. The color was a grayish yellow with a more definite yellow point above. The growth continued slightly for nearly two months, but the eyeball remained white and comfortable. Corrected vision is 20/30.

The case was shown because here again there was some difference of opinion as to the procedure indicated. The writer declined to advise enucleation, and upon watching the eye for the last three months no change could be recognized in its appearance.

The question of diagnosis involved a decision as to the malignant character of the growth. The writer inclined to its non-malignancy.

### An Unusual Case of Glaucoma

Dr. Luther C. Peter gave the history of the following case: R. L., aged thirty-five years, single; a mulatto, suddenly developed pain and redness of the right eye June 28, 1912. He was treated in the South from June to December for iritis. The history of this early attack was quite vague, but apparently atropin was used continuously from June to December, after which eserine was employed. Prior to the onset of the trouble, during the winter of 1911, the patient suffered from rheumatism. She came to the Polyclinic Hospital August, 1913. At that time she was suffering from an absolute glaucoma of the right eye and there was considerable cupping of the left disk, although the fields were practically normal. A broad iridectomy was performed on both eyes. As the right eye continued to be painful, one year later, a sclerocorneal trephining was performed on the right eye by the late Dr. Wendell Reber. Since then the right eye has remained quiet and has been entirely painless. The patient had at times, previous

to the iridectomy of the left eye, some vague pains but never knew that her left eye was involved.

The condition at present is as follows: Tension varies from 20 to 25 mm. Hg. There is no pain, and no pericorneal redness. The fields are interesting because they show a typical Bjerrum sign, namely, a large reëntering angle which extends to and includes the enlarged blind spot of Marriotte. The field has remained stationary during the past year and a half. The ophthalmoscopic examination shows a typical glaucomatic cupping which includes a good part of the disk and extends to the margin of the disk on the temporal side. Vision 20/20.

The points of interest in the case were:

1. The early history, which was very vague, but because of the bilateral character of the glaucoma, it was more than likely that the right eye began as a glaucoma.

2. The early age of onset. The patient was about thirty years of age when she first noticed the loss of vision. It is more than likely, therefore, that the first evidence of disease dates back considerably further. Just at what age the trouble began is difficult to say. It must, however, have been considerably under thirty years of age.

3. The Bjerrum sign. This sign, Dr. Peter thought, was present in a great many more patients than is usually supposed.

4. The value of the broad iridectomy was here emphasized. He performed the iridectomy August 5, 1913, almost five years ago and the patient had lost since then very little in her visual field.

## Regeneration of a Cornea Partially Lost during Gonorrheal Ophthalmia

Dr. J. Milton Griscom gave the details of a case of severe corneal ulceration secondary to an attack of gonorrheal ophthalmia. The ulcer involved the entire cornea with the exception of a zone about 2 mm. wide at the upper limbus, and penetrated as far as Descemet's membrane at one point in the lower half of the ulcerated area, but did not perforate it. The ulcer eventually began to heal

and the cornea to regenerate from the uninvolved strip at the upper limbus. Instillations of eserine, alum and adrenalin (1–1000) were used during the process of repair. At the time of the report six weeks after the beginning of the ophthalmia, the upper third of the cornea was entirely clear, the middle third showed a faint superficial haze, and the lower third was somewhat more opaque. The patient was conscious of increasing clearness day by day, his vision being 14/200. Dr. Griscom thought the case to be one of true regeneration of the corneal stroma following ulceration.

Dr. Zentmayer thought the repair of the cornea in this case had been very remarkable. He saw the case repeatedly during its stay in the Wills Hospital and at one time, while the conjunctival inflammation was still very intense the destruction over a large part of the cornea seemed to extend down to Descemet's membrane. He was sure, had the case been his, there would not have been a case of regeneration of the cornea to show.

Dr. Hansell said the use of adrenalin in the treatment of corneal ulcers was practised extensively by the late Prof. Stanculeanu, although it was not sure that he claimed originality in this method.

During Dr. Hansell's stay in Bucharest, in the summer of 1914, he observed a number of cases, both traumatic and secondary, purulent and non-purulent, in which the only treatment, other than cleansing, was adrenalin 1-1000 dropped into the eye every two hours. The efficaciousness of this drug was demonstrated in about one-half of the cases.

## Unusual Case of Steel Injury

Dr. William M. Sweet exhibited an unusual case of steel injury. The metal, 4 x 2 mm., passed through the lower lid at the inner portion, 1 cm. from the margin, and was located by the *x*-rays to the temporal side of the orbit, below and back of the eyeball. From the history of the injury the steel must have passed in a slightly upward direction through the eyelid, probably wounding the eyeball at its lowest portion, and then was deflected downward

to the situation indicated by the radiographs. Vision was not affected for several hours after the accident, and at examination equalled good light projection. Only a grayish reflex was seen by the ophthalmoscope.

## Gunshot Wound of the Eye

Dr. Howard F. Hansell reported the following case:

William H., aged nine years, while at play with boy friends on February 12, 1918, was struck in left eye with a small B. B. bullet from an air gun. General family history, personal history and general physical examination negative. Upon admission a few hours following the accident the anterior chamber was filled with blood, the eye intensely injected but no rupture of external tunics was apparent. The usual local treatment was ordered and an *x*-ray immediately taken which was negative. As the blood in the anterior chamber absorbed, it was found that an iridodialysis was present down and in with traumatic cataract, the capsule having ruptured and the swollen lens had partly filled the chamber especially at the upper two-thirds.

The pupillary fibers of the iris at the lower edge were ruptured and the iris adherent to lens capsule despite the active use of atropine.

The muddy appearance of the iris, a somewhat cloudy anterior chamber, swelling of lens, tendency to rise of tension, intense watering and dread of light with some lacrimation and photophobia in the fellow eye led to a divergence of view as to the best procedure to be adopted.

During a temporary absence of the writer for a few days the atropine was continued beyond the proper point and the cornea became steamy with definite rise of tension notwithstanding considerable absorption of swollen lens matter. Eserine was at once ordered, followed by a clearing of the cornea and the marked amelioration of all symptoms in each eye. As light perception and projection are now definitely present it was felt that the operation upon the remaining capsule was likely to result in a saved and probably useful eye.

OCTOBER 17

## The Basic Principles of Diagnosis in Motor Anomalies of the Eye

Dr. Alexander Duane, of New York, addressed the Section by invitation on "The Basic Principles of Diagnosis in Motor Anomalies of the Eye." He said that tests for the ocular muscles must obviously be based on an answer to the following questions: (1) What are the normal movements of the eyes singly and in conjunction? (2) What are the possible perversions of these movements, and what distinctive evidence of its presence does each particular perversion afford? (3) What are the most ready means of bringing these distinctive evidences to light?

The first question was subdivided into the following queries (*a*) What are the actions of the individual muscles of the eye? (*b*) How are these coördinated to move each eye by itself? (*c*) What are the coördinated movements of the two eyes acting together.

Dr. Duane then discussed these questions under the heading of: (1) Action of individual muscles. (2) Monocular movements. (3) Binocular movements. Following this he spoke of the varieties of motor anomalies: (*a*) Affections of conjugate movements. (*b*) affections of convergence, and (*c*) affections of divergence.

Finally, the tests to be used and what they determined were discussed in detail.

Dr. Duane's paper did not readily lend itself to abstraction, and accordingly to be appreciated must be read in full.

### Discussion of Dr. Duane's Paper

Dr. Howard F. Hansell: I desire to thank the essayist for the profitable and interesting paper. The subject as presented by him is so comprehensive that my remarks must be limited to only one or two points. I was particularly interested in the emphasis laid upon the physiological action of the muscles: (1) of one eye,

and (2) of both eyes in association, for unless our conception of physiology is clear our interpretation of pathological states will be obscure. Dr. Duane stated the outward rotation, for example, is accomplished by the contraction of three muscles—the external rectus and the two obliques—the eye being held in vertical equilibrium by the superior and inferior recti, and of the six muscles only one is inhibited. We can readily understand that this apparently simple function is in fact a most complicated one. The contraction of one set of muscles must be balanced exactly not so much by inhibition as by relaxation of the antagonists. And how much more complicated when we remember that the muscles of both eyes act simultaneously in equal degree of contraction and relaxation. Thus in every movement the twelve extra-ocular muscles and at least three pairs of cranial nerves with their centers and cranial connections are involved. It would seem that treatment directed to the changing of the attachment of one or even two muscles by operation may be successful only in a small proportion of cases.

Probably the most accurate test for detection of low grades of phorias is the Maddox rod. For degrees higher than two the cobalt glass is satisfactory. Through it the image is small and colored and easily recognized in a moderately darkened room, and its position in relation to the true light signifies correctly the altered direction of the visual axis of the eye behind it.

Dr. Zentmayer said he could add nothing that would further clarify the subject which Lieutenant Duane has so elaborately and lucidly presented. He thought it might be of interest, however, to state his experience with the different procedures employed for diagnosis. In teaching he had found in the axiom that "the false image has the position and inclination which the affected muscle gives to the eye when acting normally," and that "in paralysis of the elevators and depressors that eye is paralyzed whose image is higher, and in paralysis of a depressor that eye is paralyzed whose image is the lower;" that the correlation of the terms "elevator" and "higher" and "depressor" and "lower" help to fix the relations of the false images. The grouping of the vertically acting muscles

has also been of great value. In working out a case one of the difficulties in studying the images, when unassisted, is to have the patient keep the head in the primary position. While he had had no experience with the method of Bielschowski, advocated by Landolt, of having the object fixed and moving the head of the patient to obtain the different cardinal positions, it would seem to overcome this difficulty. When we consider how rarely by the ordinary methods the patient is able to recognize a tilting of the false image in paralysis of the elevator and depressor muscles, we appreciate the debt we owe Mauthner and Duane for emphasizing the advantage of making a differential diagnosis by the difference in the vertical separation of the images in adduction and abduction. By using a long test object, such as a cane, the tilting of the images is made easier of recognition.

The screen test is of special value, as it is an objective test. With the parallax test Dr. Zentmayer had found it difficult to have a patient of ordinary intelligence recognize the movement of the image. In studying heterophoria he routinely used the Maddox rod as, it had always seemed to him that the displacement of the image on the retina, which the phorometer produces, introduces a complicating factor.

Dr. S. D. Risley said: That he thanked Dr. Duane for the very clear statement he had given of the groups of muscles involved in the associated movements of the eyes in the cardinal fields of binocular fixation. In his personal experience, Dr. Risley had found that abnormalities of the binocular balance, excluding paralysis, might be classified into two general groups, relative and absolute; the latter being due to some abnormality in the attachment of one or more muscles of the group, and were usually associated with anomalies in the form of the orbital walls, and these were due to distortions of the anterior segment of the skull.

In the routine of office work the main difficulty was to discover which muscle or associated group of muscles was faulty, since the secondary or spastic contractions of the opposing muscles were often misleading. He felt that it was important to place the patient at rest, under, for him, unusual conditions, so that he could

not use the efforts he was accustomed to make to correct the abnormality of balance. For this he himself employed a fixed apparatus he had devised, in looking through which the patient had a circular field, as in a binocular field glass. Dissimilar images in the two eyes were secured by a dark ruby glass over one and a multiple Maddox rod over the other and a small point of light placed at six meters at the height of the patient's eyes. This secured a primary posture and removed all tendency to overcome by strain the existing abnormality. It was important that the accommodation should be completely set aside by the continuous use of a cycloplegic and a glass correcting absolutely the static refraction of each eye. These should be carefully centered in the apparatus and all measurements of the binocular balance made through them. While he agreed with Dr. Duane as to the value of the cover or screen test in many conditions, he used in preference to this the conditions above described.

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## NOVEMBER 21

### Retraction of the Globe in Adduction

Dr. Wm. Zentmayer presented a male, aged five years. At the age of seven months the mother noticed that the left eye "rolled about in the head" and says that this has persisted. With eyes in primary position there was a very slight narrowing of the palpebral fissure on the left side. The right was normal. In looking to the left the outward rotation of the left eye was limited. In looking to the right the left eye became retracted, a distinct space could be seen between the inner surface of the lower lid and the globe, and the palpebral fissure became distinctly narrowed. If the fixation was a little higher than the horizontal plane instead of the eyeball rotating strongly inward in adduction, when it reached a point just to the inner side of the middle line the eye shot strongly up. If fixation to the right was a little below the horizontal plane the adduction was increased, but no supraduction occurred. As a

rule the fundus was normal. The refraction error was a low H.+Ah., against the rule. Turk's theory probably best explains this symptom-complex. His view is that the retraction is due to inflexibility of the external rectus muscle of the eye, showing the phenomena. The oblique movements of the globe Duane attributes to spasmodic contracture of the inferior oblique. Parker attributes the closure of the fissure to some peculiar associated movement produced by synergic action of the facial and oculomotor nerves.

The fact that in this case the upward shoot of the eye, while occurring at times when the eye is rotated directly to the right, manifests itself always and more strongly if the fixation is slightly above the horizontal plane suggest that this contraction of the inferior oblique may be due to a slight paresis of the superior rectus muscle of the opposite eye.

### Unilateral Vertical Nystagmus

Dr. Zentmayer showed a girl, aged fifteen years. She had measles at three years of age, complicated with otitis media purulenta on the left side, and esotropia of the left eye. Two years ago glasses were prescribed and the esotropia disappeared. The eyes are now stationary under cover. The left eye presented a vertical nystagmus. The movements were rather slow. The right eye by naked eye examination seems to be without nystagmic movements. Nor could they be detected with the ophthalmoscope until the pupil was enlarged and the optic papilla closely watched when very slight vertical motion was detected.

Most of the cases of so-called unilateral nystagmus prove on careful study to be really Anisonystagmic.

### Pigmentation of the Excavation of the Papilla

Dr. Zentmayer exhibited a colored woman, aged twenty-seven years, who came to Wills Hospital because of asthenopia, right-sided pain in the head and recurrent styes on the left side. In

R. E. there was a small vacuole in the lens. The papilla was oval axis 95° and presented an unusually large excavation involving four-fifths of its surface. It was of the undermined type. Within the limits of the excavation on the temporal side there was a dark-gray crescent. The pigment seemed to be on the outer wall of the excavation. Contiguous with this, outside of the excavation, which extended up to the scleral ring, there was a conus of pigment of much the same tint. In the L. E. the appearances were identical. The refraction error is a low H. As.

### Tuberculoma of the Iris

Dr. Zentmayer showed a colored girl, aged six years, the history of whose case had not been unsatisfactory. The L. E. had been inflamed several weeks attributed to a finger-nail scratch. There was a yellow-white oval mass 4 x 5 mm. occupying the angle of the anterior chamber and pressing upon the cornea. The cornea was very hazy and the epithelium shagreened. The pupil dilated in the temporal side. No detailed view of the fundus. T-n. Moderate ciliary congestion. Upper incisors slightly notched. Wassermann negative. von Pirquet positive. After the inoculation a small gray focus of infiltration appeared in the cornea. Animal inoculation will be performed to confirm the diagnosis.

### Successful Extraction of an Opaque and Dislocated Lens

Dr. Howard F. Hansell presented a woman, aged forty-five years, who complained of gradually increasing loss of vision for ten or more years. A diffuse uniform opacity involved the entire lens of each eye. She had frequently sought surgical aid but had been refused.

A preliminary iridectomy on each eye was performed. A slight escape of vitreous followed in each eye, drawing attention for the first time to the dislocation of the lenses. The wounds healed promptly although final recovery was slow.

The left lens was extracted a few weeks later by the wire loop

with the loss of an insignificant amount of vitreous Recovery uneventful. Final vision with correcting glass = 20/20.

The success of the operation was due in great part, if not altogether, to the large conjunctival flap, prepared before making the limbus incision, and drawn completely over the wound after the lens was extracted.

Dr. Krauss recalled the case of an aged man, who dislocated cataractous lens into the anterior chamber, by slipping in taking a bath. The eye became painful. The lens was successfully removed with a loop with splendid visual results.

## Acne Rosacea Keratitis

Dr. J. Milton Griscom exhibited a patient who had complained of sore eyes during the past eight months. She was forty-seven years old, a heavy eater and suffered from chronic constipation. For the past two years she had suffered from a typical acne rosacea involving her nose, chin and cheeks, which appeared at about the time her menopause first manifested itself. When first seen the bulbar conjunctiva of both eyes showed numerous pin-head-sized elevations adjacent to the cornea resembling phlyctenules with marked injection. On the corneæ near the limbus were several areas of superficial infiltration about 2 mm. in diameter surmounted by whitish necrotic tissue the size of a large pin-head. There was a band of superficial bloodvessels running from the limbus on both nasal and temporal sides. The remainder of the cornea was clear and the other ocular structures were free from disease.

Dr. G. Oram Ring presented a preliminary report of an interesting case which involved a "Question of Diagnosis" as between malignant disease of the retina, and the other pathological conditions, with which it can be confounded.

The patient, Eleanor B., aged eleven months, has been under observation for two weeks only. The child had enjoyed perfect health from birth, until one month before being seen by Dr. Ring, when without the slighest premonition she had a convulsion.

Two days previously, the patient swallowed a very hard cough drop, which was passed in forty-eight hours. During this same period the mother was suffering with influenza (temperature 102°) and had regularly nursed the child. With the onset of the convulsion, the child was immediately weaned.

Tuberculosis and syphilis were excluded, as was malignant disease in the family history. Barring the ocular condition, the child was in all respects normal. The morning following the convulsion, the eyelids of the right eye were greatly swollen, and remained so for one week, at which time a "white skin" over the sight was observed by the mother.

At the initial hospital examination there was a moderate lid swelling and a general pericorneal and conjunctival flush. The cornea was lightly hazy, the anterior chamber quite shallow, the periphery of the iris retracted into a definite sulcus, especially down and out, the pupillary edge being pushed forward to the posterior corneal surface, the iris thus forming an almost right-angled curve. The pupil was vertically oval, the lens slightly hazy, irregularly swollen and pushed forward, especially in the center and to the temporal side. The reflex was pinkish white and proceeded from the anterior part of the vitreous. Across this mass ran a large and dilated bloodvessel. The tension was definitely minus, and transillumination gave only a faint reflex up and in.

Dr. Ring reviewed the points in differential diagnosis, of simple, retinal detachment, tubercular choroiditis, cysticerci, congenital anomalies, metastatic choroiditis, retinitis with massive exudation, retinitis circinata, and dropsical degeneration of the rod and cone visual cells (de Schweinitz and Shumway) and leaned to the diagnosis of retinal glioma, expressing the possibility that a metastatic influenzal toxemia, may have played a minor role in inducing the ocular picture presented.

Dr. S. D. Risley said that Dr. Ring had kindly given him the opportunity to study the case in consultation. He had rarely seen any example of disease which gave wider opportunity for differences of opinion as to its essential character. Dr. Ring's careful and

elaborate analysis had left little opportunity for additional comment. The sudden onset of convulsions with subsequent expulsion of a foreign body from the bowel, followed by the inflammatory conditions in the eye with loss of vision, due to an extensive detachment of the retina accompanied by objective signs of an underlying neoplasm opaque to transillumination, is certainly an unusual history. While there is the possibility that the intestinal conditions leading to the convulsions had caused a general toxemia which found local expression in the eye as a general retinal or subretinal edema, or possibly a choroidal hemorrhage which would be opaque to transillumination; nevertheless, careful study of the eye left the positive impression of the presence of a new growth.

In the presence of the extensive detachment of the retina, he did not feel that the diminished tension of the ball necessarily contra-indicated the presence of a new growth, as he had many times seen examples of detachment of the retina, where subsequent enucleation had demonstrated the presence of a sarcoma, but which had nevertheless presented normal or diminished tension as part of the clinical picture. Notwithstanding this somewhat definite statement of opinion, he nevertheless felt that the questionable diagnosis could be rendered definite only by the laboratory study of the eye, and he hoped that Dr. Ring would at a subsequent meeting of the Section inform the Fellows as to the pathological finding.

Dr. Zentmayer said there were two statements in Dr. Ring's paper which were open to discussion. Dr. Ring states that detachment of the retina could be excluded because of the absence of trauma and of a refraction error of sufficient degree to cause it. These, however, were not all of the causes of detachment and there was one pertinent to the diagnosis in his case. Nettleship first described the condition, and there have been several since reported, one by Dr. Zentmayer in which the picture of glioma was due to detachment of the retina the result of the subretinal presence of a serous fluid containing cholestrine, the probable remnants of an extension hemorrhage. These cases have usually a history of a preceding exanthem, commonly measles. As to

the value of the intra-ocular T. in diagnosis Dr. Zentmayer's personal experience was at variance with that of many clinicians. He had never met with minus T. in an eye with a well-defined intra-ocular tumor, unless perforation of the coats of eye had occurred or a iridocyclitis had developed. He had, however, met with plus T. in pseudoglioma. Personally, therefore, he would consider a decided plus T. to strongly favor a diagnosis of glioma and a decidedly minus T. to almost surely exclude this diagnosis.

Dr. Hansell said the careful clinical analysis of the pathological changes so graphically depicted by Dr. Ring point to but one interpretation, namely, glioma of the retina. He examined the patient at Dr. Ring's request upon two occasions at an interval of a few days. During that time the disease had perceptibly advanced. The vitreous body was completely filled by a white mass, the lens pushed forward until the anterior chamber was almost annihilated. The rapid growth, the characteristically white appearance of the tumor, the absence of history of any of the usual causes of pseudo-glioma, made the diagnosis almost certain.

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## DECEMBER 19

### Metastatic Uveitis

Dr. Charles R. Heed detailed clinical notes of a case of bilateral metastatic infection of the uveal tract in a boy during the course of cerebrospinal meningitis, due to the meningococcus. The patient, aged ten years, complained of poor vision four days after the onset of the disease. First examination of eyes showed a marked yellowish exudate covering the pupillary space, with turbidity of aqueous, discolored irides and pupils fixed. Tension plus one, and vision reduced to light perception in each eye. The inflammation progressed for three days and then began to subside. On the eighth day the aqueous was clear, exudate less dense and vision, right eye, hand movements, left eye, counting fingers at eight inches. Improvement continued, and two months

after first examination there was a very moderate circumcorneal injection, a few tags of posterior synechia and several dots on Descemet's membrane. The fundus reflex clearing showed a few vitreous opacities, the optic disease showing evidence of a previous neuritis and far forward there were areas of a low-grade choroiditis. The unusual restoration of vision in this case is credited to four intraspinal injections of meningococcic serum.

Dr. William M. Sweet stated that he saw the case at the height of the inflammation. At that time the exudation in the right eye covered the pupillary area and a portion of the iris to the nasal side. In the left eye the exudation was less in amount. The light perception was poor in both eyes, and in the right eye was uncertain except in the upper outer quadrant. Dr. Sweet regarded the improvement in vision as remarkable in view of the amount of exudative inflammation.

## A Case Showing a V-shaped Tridotomy

Dr. S. Lewis Ziegler exhibited a patient with membranous occlusion of the pupil in right eye, following postoperative infection of a complicate cataract. There was a history of iritis twenty-five years previous, with exclusion of pupil. When first seen the operated eye was still congested, but this was controlled by positive galvanism. On November 22, 1918, a V-shaped iridotomy was performed with the Ziegler knife-needle entering the corneoscleral junction above and making two long converging incisions in the iridocapsular membrane from below upward. The pupil opened up freely in the form of a triangle with base downward. Vision = 2/200. Refraction gave 20/70 with S + 11.D = C + 1.D Ax. 110° and J–12 with S + 3.D added. A faint opalescent reflex over the vitreous surface, exposed in the artificial pupil, suggests the possibility that an adventitious hyaloid membrane may be forming. If the suspicion proves correct this membrane will be incised in the hope of improving the vision.

On November 30, 1918, the cataract in the left eye was extracted, first inserting a modification of Kalt's suture in order to quickly close the globe and protect it against infection. Double-threaded needles were inserted, one in the sclera above the proposed incision and the other in the cornea just below it. A Graefe knife was passed between the threads, a large section of adherent iris was excised and the lens quickly removed. The lens was semitransparent but the nucleus was hard. The cortex did not escape freely, owing to its gluey character. The corneal suture was drawn taut and tied, thus making a firm self-supporting mattress suture. The field of operation was treated as an open wound with free irrigation and applications of ice pads. Although some flakes of mucopus were several times noted, there was no infection or other untoward symptom. There is considerable swollen cortical, but this is absorbing slowly. A secondary capsulotomy will, of course, be required later.

### Injury Due to Rat Poison

Dr. McCluney Radcliffe reported a case of loss of eye, the result of an explosion of a tin can of "Common Sense" rat poison.

While the patient was prying off the lid of the can it exploded with sufficient force to break her spectacle lens and cut a jagged wound in the cornea, the iris prolapsing.

The incarcerated iris was excised and the wound closed.

The lens was cataractous, and finally panophthalmitis developed, necessitating enucleation of the eyeball. On section of the ball a wedged-shaped piece of glass, 8 mm. long, 3 mm. wide and 2 mm. thick, was found in the vitreous just back of the lens. The vitreous was filled with pus.

### Conjunctival Scars from Inherited Lues

Dr. J. Milton Griscom exhibited a girl, aged seven years, who had unusually well-marked facial and dental signs of congenital syphilis. She also had prominent areas of scar tissue

on the conjunctival surface of both upper and lower lids. These resembled the scars seen after trachoma, but there were no signs of previous corneal involvement or evidence of distortion of the lids. Both parents were free from any evidence of trachoma, and it was considered that the conjunctival scars were the result of a prenatal syphilitic infection, with the probable formation of conjunctival gummata previous to birth.

## Résumé of the Activities of the Division of Surgery of the Head

(Office of the Surgeon-General, with Special Reference to Ophthalmology.)

Colonel Walter R. Parker presented, by invitation, a very interesting and instructive paper.

Lieutenant-Colonel de Schweinitz, supplementing Colonel Parker's address on the activities of the Division of Surgery of the Head, and referring entirely to the Section of Ophthalmology of the Medical Corps of the United States Army, spoke of the endeavor which had been constantly present to keep the ophthalmic personnel at a high standard of efficiency. To this end, in addition to the camp instruction to which Colonel Parker had referred, and the various addresses which had been made during camp inspections, the School of Ophthalmology in connection with United States General Hospital No. 14, at Fort Oglethorpe, was founded during the summer. It had been in contemplation for a long time, but the actual organization did not take place until July of the present year. This school had afforded the opportunity, because of the qualifying examinations which were necessary for entrance, as well as the qualifying examinations which were required at the end of a four weeks' intensive training course to remain in the ophthalmic work of the army, of greatly improving the selection of those men needed to fill the various ophthalmic positions. The abundant material used in teaching, as well as the carefully planned operative course and the coöperative work

with the other departments of the hospital, for example, in neurology, urology, general medicine, oral and plastic surgery, had made it possible to develop a work which was the equivalent of any high-grade post-graduate ophthalmic course in the country, and in point of fact, in many respects was superior to it. After the school had been fully organized it was placed in charge of Major Meyer Wiener, and he and his associates had done admirable work.

Colonel de Schweinitz briefly referred to the opportunities that had been his own to study the types and needs of war ophthalmic work in France during the fall and winter of 1917 and 1918, and the observations made there had been incorporated as much as possible in the work on this side of the water. He did not attempt to describe the very complete organization of the ophthalmic work of the A. E. F., in charge of Lieutenant-Colonel Greenwood, ably assisted by Lieutenant-Colonels Black and Derby. Doubtless these officers would on their return make full description of their work. Colonel de Schweinitz paid a high tribute to the skill and effectiveness with which Colonel Parker had conducted his duties as Chief of the Division of Surgery of the Head in the Surgeon General's Office.

## Fatty Degeneration of the Cornea

Dr. Burton Chance exhibited a woman, aged sixty-eight years. The disease was first noticed about a year ago, although no cause could be assigned for it by the patient. The area was elliptical in outline and occupied the lower hemisphere of the left cornea. The horizontal diameter was about 6 mm., the vertical 4 mm. The plaque was yellow and greatly resembled the appearance of highly polished old ivory. It lay beneath the epithelium and was quite distinctly demarcated from the healthy cornea. In the relation between it and the sound tissue it might have been likened to the lunule of the finger nail, but so distinctly did it appear that at a distance, so solid was it, it might have been mistaken for a dislocated calcareous lens in the anterior chamber. The

epithelium at the center had become eroded by a stiff eyelash in the lower lid. This irritation had excited injection and had caused a fine leash of vessels to extend over the surface from the lower limbus. Elsewhere there were no bloodvessels. There were no other signs of disease. The area had given rise to no symptoms other than blurred sight as the mass extended quite above the pupillary border.

It is likely that the disease arose from long-continued irritation of the surface of the cornea by distorted eyelashes.

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## JANUARY 16

### Spontaneous Rupture of the Anterior Lens Capsule with Rapid Development of Cataract

Dr. William Zentmayer exhibited a case unique in his experience. A cataract due to a break in the anterior capsule of the lens revealed by the dilatation of the pupil in an eye with an apparent perforating corneal ulcer occasioned surprise which turned to astonishment on the later occurrence of a similar condition of the lens and its capsule in the fellow eye showing no recent signs of trauma or inflammation. O. M., female, aged nineteen years, came to the Wills Hospital October 9, 1918. She was employed in weighing powder in a munitions plant. The left eye had been sore for ten days. There was no history of trauma. She was an epileptic. There was moderate photophobia and lacrymation with marked ciliary congestion. The cornea was hazy throughout and showed a perforated ulcer in its lower inner sector corresponding to the position of the pupillary border of the iris. The iris was engaged in the ulcer and the pupillary area was opaque. This was at the time supposed to be due to exudation. Later, however, when the pupil had been dilated with atropin it was determined to be opaque lens-matter protruding from a rent in the anterior capsule. V. = L. P. In the right eye the cornea showed fine linear and curvilinear gray opacities

in its lower and also temporal portion. On the temporal side there was an absence of complete differentiation between the corneal and scleral tissue and there was what appeared to be a small congenital symblepharon. Fundus normal. V. = . 6/21.

She was admitted to the hospital, an *x*-ray was made and appeared negative. Under appropriate treatment the inflammation subsided and when she was discharged on October 21 the globe was white and the anterior chamber shallow, pupil nearly round, there being a slight anterior synechia. The lens was opaque and cortical protruded from the rent in the anterior capsule. V. = hand movements.

After her discharge she was seen a few times in the dispensary for treatment of the affected eye and on October 25 she again reported stating that two days previously on arising in the morning she was unable to see to go to work. Vision gradually grew worse. There was very slight ciliary injection; the cornea showed the condition previously noted and the lens was cataractous, cortical matter protruding into the anterior chamber. V. = hand movements. On December 4 a linear extraction was done on the right eye and on December 16 a needling of the remaining cortical and capsule. January 13: V. = 20/100 + 13 D.

Two possible explanations of the condition present themselves: (1) Tetany and (2) self-induced trauma. Tetany is a well-recognized cause or accompaniment of cataract. A history of convulsions is present in a not inconsiderable percentage of zonular cataract and there are observers who claim to have found tetany a cause or accompaniment in many cases of senile cataract. It is possible that the associated conditions in the first instance have a common cause in a disturbance of metabolism arising from abnormalities in the secretion of one or more of the endocrine organs. Whether repeated convulsions could cause a rupture of the capsule in a normal development is doubtful when we consider the frequency of epilepsy and the absence so far as Dr. Zentmayer knew of any previously reported cases of cataract arising in this way. It is conceivable that there may have been a structural weakness of the capsule through faulty development. The theory

of self-induction in this case would have had stronger support if the cataract had been combined with a corneal lesion in the second eye. But in this eye there was no evidence of a recent wound or ulcer of the cornea. When the patient presented herself, two days after the loss of vision had been noted, the anterior chamber was shallowed and the eye was slightly injected, both symptoms were probably due to the swollen lens.

Dr. Ziegler stated that the three prominent factors to be studied in Dr. Zentmayer's case of ruptured capsule were chemical erosion, ulceration and trauma from the convulsive seizure. Undoubtedly the chemistry of metabolism in an epileptic was always perverted, but whether this could extend to the lens substance was difficult to demonstrate. He had seen a case of exceedingly irritating chemicals in a lens cortex that produced an exacerbation of glaucoma whenever the capsular contents escaped. Ulceration could only be considered by analogy as the history shows such a lesion on one cornea just over the ruptured capsule. Weakening of the capsule either by erosion or ulceration would undoubtedly encourage traumatic rupture in a case of epileptiform convulsion, but the exact lesion of the capsule could only be determined by withdrawing the ruptured capsule for microscopical examination. This might prove difficult to accomplish.

Dr. Zentmayer, closing the discussion, said the case was seen by Dr. Lucien Howe while he was in Philadelphia and he suggested that it was probably due to injury self-induced. Colonel Parker suggested an abnormality in the capsule and thought that possibly rupture of the capsule might have resulted from the falls when the patient was in convulsion.

## Extensive Pigment Changes in the Retina following Injury

Dr. Krauss presented a case of a boy who was struck by a B. B. shot in the left eye. The *x*-ray two days later showed the ball very plainly in the anterior part of the orbit. Later *x*-ray plates

showed the disappearance of the ball. As no ball could be found, Dr. Krauss thought that the apparent shot in the eye was made by the staining of the tissues by the lead ball. The retinal changes were very marked in the pigment layers, resulting in many pin-head opacities scattered through the lower half of the eyeball with a large mass to the temporal side.

Dr. C. R. Heed, in discussing the *x*-ray plates exhibited by Dr. Krauss, directed attention to the symmetrical shadows of the anteroposterior and the lateral exposures, indicating that the body casting the shadow must have been spheroidal in shape. Dr. Krauss's explanation that the shadows were made by a film-like deposit on the eye-lids does not bear out the shadows on the plates. It is hardly possible that a film of lead on the lids would be shown on the plates after the rays had passed through the head, but if we concede that such is a possibility the anteroposterior shadow would be circular while the lateral one would be not much more than a line or a narrow ovoid streak.

Burton Chance called attention to the marked pigmentary changes at the posterior pole of the affected eye in Dr. Krauss's case. Changes such as are there presented have been recorded but seldom in recent years. He was sure that the Chairman, Dr. Shoemaker, had seen, alas, too many cases, while it has been his own privilege to have had under observation 30 cases following direct injury to the globe. And he is certain that similar cases will arise frequently in our practice now that the wounded are being returned. It will be interesting to observe the progress of Dr. Krauss's case and to note whether in the course of time the pigment masses shall disappear only to reveal irreparable lesions of the choroid.

Dr. Ziegler asked Dr. Krauss whether the crescentic ulcers on the lid margins might not be due to friction burns. If a B. B. shot should spin around after striking the tissues it might produce a burn from friction and also make a deposit of lead that would obstruct the passage of the *x*-rays in at least one direction. Experiment might determine these points.

### Unilateral Disseminated Choroiditis in the Early Stage

Dr. Krauss also reported a case of unilateral disseminated choroiditis, occurring in a seventeen-year-old boy. The lesions varied from a slight yellowish fluffy swelling of the choroid to a more advanced aggregation and absorption of pigment. There were no vitreous opacities. Wassermann, +1.

Dr. Risley said the ophthalmoscopic picture reminded him of the conditions he had seen follow the intravenous injections of salvarsan in a patient with syphilis, who had been under his observation prior to the injection. The occurrence of ocular disease following these injections had been so frequently observed that he regarded it as a serious menace in the use of salvarsan.

### Adventitious Hyaloid Membrane

Dr. S. Lewis Ziegler again called attention to the adventitious hyaloid membrane which he thought was forming in the case of V-shaped iridotomy exhibited by him last month. Such a hyaloid membrane is liable to form in any case of aphakia where an incision of the iris or capsule exposes the vitreous body to the action of the aqueous. As a matter of fact, it seldom occurs. Dr. Ziegler had only observed it in some 6 or 8 cases during a period of more than thirty years.

The two characteristic symptoms are: (1) A faint opalescent reflex of the vitreous surface when exposed to oblique illumination; and (2) inability to correct the near vision beyond J-10 or 12, although the distant vision may have been corrected up to 20/30. Such a result, of course, does not yield useful reading vision and is a source of annoyance to both patient and physician. In other words, there is a distinct lack of normal proportion between the distant and near vision in an aphakic eye that may otherwise appear to be perfectly normal.

The proper procedure in such a case, although no capsular mem-

brane is visible, is to make a *pro forma* incision of the vitreous surface exposed in the pupillary area (V-shaped or otherwise) just as though the original capsule was still *in situ*. In practically every case of this type that Dr. Ziegler had operated on good reading vision (J–1 to 4) had been obtained by this procedure.

In the case of iridotomy shown last month it will be recalled that the distant vision with correcting lens was 20/70 and the addition for near J–12. The hyaloid film was incised on December 28, 1918, and one week later the same glasses yielded a vision of 20/30 and J–1. That this intangible film was really a tangible membrane was further demonstrated by a distinct sensation of iridic retraction and widening of the pupil at the very moment that the film was incised.

Dr. Krauss stated that he had seen similar cases occurring usually after the extraction of the brown or sclerosed type of lens. The healing in these cases is usually quiet with no capsule remaining. The vision is reduced, though a splendid view of the eyeground is obtained. Dr. Krauss believes that this fine opacity which is seen only by indirect illumination is due to a wrinkling in the anterior limiting membrane of the vitreous. A very free needling through the pupillary area gives a good result, although no membrane can be seen to needle.

Dr. S. D. Risley, discussing Dr. Ziegler's case, said that he had several times been disappointed because of the low acuity of vision after successful extractions of cataract leaving an apparently clear black pupil and good but a slightly blurred ophthalmoscopic view of the fundus, and revealing no serious pathological change in the uvea or lack of consistency in the vitreous. In using the plane retinoscopic mirror, however, he discovered, when the light from the mirror fell obliquely upon the pupil, a finely striated, iridescent faint sheen back of the pupil, reminding one of the colored sheen seen on the interior of a clam or oyster shell. He had ascribed this appearance to a disturbance of what the anatomist would call the "anterior limiting membrane" of the vitreous body. With this explanation in mind he had not ventured upon any operative interference.

# REPORT OF THE SECTION ON OTOLOGY AND LARYNGOLOGY

In accordance with the By-laws of the College, the Clerk of the Section respectfully submits the following report:

The membership of the Section on November 30, 1917, was 27.

The total attendance of the meetings was 155; the average attendance of guests was 17. The average attendance of members was 8.

Seventeen subjects were presented and discussed.

The officers of the Section elected December 19, 1917, are:

Chairman—Dr. S. MacCuen Smith.

Clerk—Dr. Nathan P. Stauffer.

Executive Committee—Dr. F. O. Lewis, Dr. C. C. Eves and Dr. Nathan P. Stauffer.

## List of Papers

*December* 7, 1917

Symposium on the Correlation of Eye, Ear, Nose and Throat Diseases.

Dr. S. MacCuen Smith: "Intracranial Complication of Aural Diseases in Relation to Ophthalmology." Discussed by H. F. Hansell.

D. S. L. Ziegler: "Ocular Signs and Symptoms Associated with Intranasal Lesions." Discussed by Dr. B. A. Randall.

Dr. Chas. K. Mills: "Cerebral Localization in its Relation to Ophthalmic and Aural Symptomatology." Discussed by Dr. Weisenberg.

Dr. Wm. Zentmayer: "Ocular Lesions the Result of Aural and Pharyngeal Diseases." Discussed by Dr. C. P. Grayson.

Dr. E. B. Gleason: "Obstructive Lachrymonasal Diseases and Their Treatment." Discussed by Dr. W. C. Posey.

*January* 16, 1918

Major Charles W. Richardson, M.R.C. (from the office of the Surgeon-General, Washington, D. C.): "Otology in the War."

*February* 20, 1918

Symposium on Acute Otitis Media.

Dr. C. C. Eves: "Symptomatology and Etiology."

Dr. Charles P. Grayson: "Treatment."

Dr. A. W. Watson: "Mastoiditis as a Complication."

Dr. Clarence W. Schaeffer (by invitation): "In Scarlet Fever and Measles."

Dr. Edwin E. Graham: "From the Standpoint of the Pediatrist."

Discussed by Dr. B. Alexander Randall.

*March* 20, 1918

Dr. C. Jackson: "Difficult Bronchoscopic Foreign Body Cases." Illustrated with lantern slides, blackboard drawings and specimens.

*April* 17, 1918

Major E. B. Dench, M.R.C., U.S.A. (New York City): "Otitic Meningitis."

Professor John A. Kolmer: "The Bacteriological Findings of Otitic Meningitis." Discussed by Dr. Marshall, Dr. Gleason, Dr. Eves and Dr. Fisher.

*November* 20, 1918

Symposium: Unusual Complications of Epidemic Influenza.

Dr. B. A. Alexander: "Ear Complications."

Dr. N. P. Stauffer: "Sinus Complications." He also exhibited a patient who had double Knapp frontal operation and another with single Knapp frontal operation; also a transplantation of tibia to the nose which had become necrotic after six months' insertion.

Dr. Eves: "Throat Complications."

Discussed by Dr. Van Zant, Dr. Burns, Dr. Pennington, Dr. Marshall, Dr. Butler, Dr. Gleason, Dr. Smith and Dr. Buchanan.

Nathan P. Stauffer,
Clerk.

# REPORT OF THE SECTION ON INDUSTRIAL MEDICINE AND PUBLIC HEALTH

This Section of the College was organized June 26, 1917.

Dr. James M. Anders was elected Chairman and Dr. W. G. Elmer, Clerk.

Subsequently the acting President of the College, Dr. Thomas R. Neilson, after conference with the Chairman of the Section, appointed an Executive Committee: Dr. Alfred Stengel, Chairman; Dr. John B. Roberts, Dr. W. G. Elmer, Clerk, the Chairman of the Section (*ex-officio*).

The Section has held three meetings. Addresses have been made by the Chairman, Dr. James M. Anders; Dr. Charles McIntire, of Easton, Pa. (corresponding member of the College of Physicians); Dr. Alfred Stengel, Dr. Gwilym G. Davis, Dr. Frederick L. Hoffman, of the Prudential Life Insurance Company, of Newark, N. J.; Dr. William L. Estes, of South Bethlehem, Pa. (Corresponding Fellow of the College of Physicians); Dr. H. R. M. Landis, Dr. A. J. Lanza, United States Public Health Service, Pittsburg, Pa.; and Dr. Francis D. Patterson.

The attendance at the meetings was 38, 40 and 36.

It is the purpose of the Section to hold four regular meetings each year—October, December, February and April.

The transactions of the Section will be published in full in the annual *Transactions* of the College.

James M. Anders, M.D., Chairman.
Walter G. Elmer, M.D., Clerk.

# PROCEEDINGS

OF THE

# SECTION ON INDUSTRIAL MEDICINE AND PUBLIC HEALTH

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## MAY 15

### Hazards of Metal Mining

By A. J. LANZA, M.D., U.S.P.H.S.

The occupation of metal mining in contradistinction to coal mining has always been recognized as being hazardous to health. Deficient ventilation, exposure to deleterious gases and in recent years the fumes of explosives, mineral dust, metallic poisoning and occasionally hookworm disease, all have tended to make metal mining an undersirable occupation. Moreover, metal mining has contributed to medical science an occupational disease of the first magnitude, the so-called miners' consumption; a disease, however, not by any means confined to the miner. As the other health hazards of the mining industry are within the province of recognized standards of hygiene, we will confine our discussion to miners' consumption, more properly called silicosis. Silicosis is a pneumoconiosis caused by the inhalation of silicious dust, and is found among metal miners, smeltermen, glass-workers, potters and in other occupations. But it is among hard-rock miners that it has, so to speak, reached the flower of perfection and becomes the scourge of mining camps in America, Canada, Australia, South Africa and England; that is, wherever mining is done in rock containing a large amount of silica. It has been known for cen-

turies. Hippocrates speaks of "the metal digger who breaths with difficulty and is of pale complexion." Loehness, a German author in a book on mines and mine workers, written in 1690, says: "The dust and stones fall upon the lungs, so that the men have lung disease, breathe with difficulty and at last take consumption."

The introduction of pneumatic drilling machines in recent years, the operation of which envelops the workers in a dense cloud of dust, caused the victims of miners' consumption to be numbered by the thousands, until the result became so scandalous that various governments caused investigations to be made, South Africa being the pioneer, and her researches especially noteworthy. In this country two investigations have been made, one in southwestern Missouri and one in Butte, Montana, over 400 cases having been studied in each place. It is conservatively estimated that from 20 to 35 per cent. of hard-rock miners who follow this occupation steadily are affected, a condition I do not think paralleled by any other occupational disease. Carelessness and indifference have permitted this and it is one of the causes that important mining necessary for war is hindered by the class of miners now found, etc.

Individual susceptibility plays little part. The amount of silica in the dust, the duration of exposure and the intensity of work are the determining factors. A dust containing 95 per cent. silica produced results more rapidly than one containing 60 per cent. silica. A man who works hard, as in shovelling, consequently breathing more often and more deeply shows symptoms sooner than a man who sits still running an electric motor. Inasmuch as temperature, humidity, and ventilation have a marked effect in limiting the amount of labor a man can do, it can readily be seen that these factors have a direct bearing on silicosis, aside from their physical action on dust suspended in the air.

The cardinal symptoms of silicosis are dyspnea on exertion, pain in the chest associated with diminished expansion. The dyspnea comes on gradually, insidiously, in from two to ten years

after beginning exposure, depending on the factors just mentioned. It grows gradually worse until total disability may result. It may be the only symptom. Pains in the chest usually appear early and tend to shift from place to place finally becoming more definitely located. There is generally a bronchitis more or less chronic, with a cough of varying severity, but a number of these cases never cough at all. The tendency to catch cold at frequent intervals is pronounced. The sputum varies, tending to increase as the disease progresses, but may be entirely absent. Loss of weight occurs, but not to the same extent as in tuberculosis. These patients look well, and, aside from their dyspnea, feel well; they have no fever, no night-sweats, but occasionally do have hemorrhages, especially if working in a very bad dust. They notice a gradually increasing inability to work, a weakness that seems to keep pace with their dyspnea. Even when very dyspneic they do not get cyanosed. If exposure to silicious dust continues the symptoms get more intense.

On physical examination there is little to be found except in a well advanced case. In these the inability to expand the chest is striking. All the ordinary and extraordinary muscles of respiration are used in the effort to move the chest wall. Otherwise the physical signs are entirely inadequate for the symptoms. As the disease becomes established the breath sounds are weakened, first the upper half behind then the upper half in front. In the later stages there are various alterations in the breath sounds, with a multiplicity of râles, rubs, squeaks and other adventitious sounds. But one does not get the typical moist râle of tuberculosis unless there is tuberculosis present, which brings us to the most important feature of this disease. At any stage of a silicosis a tubercle infection may occur; the more advanced the silicosis the more chance of infection. When a tubercle infection occurs it usually runs a fairly rapid course. As a rule, its advent is signalized by loss of weight, night-sweats, fever and a general rapid deterioration of the patient's physical condition. The sudden change which takes place when a tubercle infection becomes activated in these cases is

often very marked. Bacilli appear in the sputum and moist râles, increased by cough, are found on examination. But cases are found with tubercle bacilli in the sputum that present none of the signs or symptoms of tuberculosis. In Joplin, where the type of silicosis was very severe, tubercle bacilli practically always appeared in the sputum before death. In Butte, where the silicosis is not of such an aggravated type, tubercle infection was not so frequent. One thing has been noticed in mining camps all over the world; as time passes and the mining community becomes more settled and tubercle foci become more numerous, tuberculosis appears earlier in miners' consumption. The clinical picture is changing and tubercle infection is occurring more and more in the early and middle stages of silicosis. The duration of the disease depends mostly on the governing factors. It was the experience in Joplin that those who had silicosis and worked steadily from year to year were generally dead about ten years after beginning mining. In Butte it was longer. Two years is the usual time elapsing between disability and death, but when the patient had tuberculosis also before quitting mining the interval was less.

The diagnosis then depends on a gradually increasing dyspnea on exertion, with pain in the chest and diminished expansion and inadequate physical signs, together with a history of the occupation. Heart, kidney and other lesions have to be eliminated. The prognosis is bad after silicosis is once well established, and when tubercle infection has occurred the prognosis is usually hopeless. An outdoor life seems to afford the only chance for early cases to recover.

The pathology of the disease, briefly, is that first there is a peribronchial thickening following by small, nodular fibrous areas which tend to coalesce, forming large, dense fibrous areas which may finally undergo anemic necrosis. Just what is the relation of the tubercle bacillus to this process is not clear. Inability to obtain necropsies prevented a proper study of this feature. It might be stated that it has been shown that dust particles which lodge in the lungs are not larger than from 2 to 5 microns and even smaller.

The prevention of the disease consists of the use of water in drilling, a matter that is not always as simple as it sounds. It is evident from the small size of the dust particles that do the damage that the use of respirators is futile.

## DISCUSSION

Dr. Henry K. Pancoast: I have had the privilege of interpreting for Dr. Lanza about fifty pairs of stereoscopic plates made of the hard-rock miners at Butte, Montana, for the purpose of determining the extent of pneumoconiosis. Members of this section are familiar, from a recent paper, with the investigations made by Drs. Landis, Miller, Smyth and myself, in connection with dusty occupations in this part of the country. We find a great similarity in the appearances of these plates and those made of the hard-rock metal miners. The *x*-rays are the most accurate method of determining the exact condition of the lung, except, of course, the postmortem examination. In the comparatively few articles published on this subject from the *x*-ray standpoint all authors have practically agreed upon the interpretation of the plates as to the various stages of the condition and the appearances indicative of each. There are three stages: In the first, the appearance is that of an enlargement of the hilus shadow and an increase in the thickness of the linear markings. One must, of course, take into account the age of the patient and the place of resistance, as those who live in large cities are very liable to have more or less evidence of pneumoconiosis with advance in years. In the second stage there is a mottling in the parenchyma of the lung, due to small deposits of dust and an associated circumscribed fibrosis. These spots gradually enlarge and finally coalesce. In the third stage there is a diffuse fibrosis which picks out certain portions of the lungs and seems to originate from a coalescence of the small areas just mentioned. There seem to be certain anatomical distributions for the mottling and the diffuse fibrosis, and the findings in this connection have been fairly uniform, both in Dr. Lanza's plates and in our own. In the appearance of the second stage the mottling begins especially around the root of the lung, and in most cases there is greater progress on the right side. Then the mottling spreads around the lung from base to apex. In the plates examined for Dr. Lanza the most intense mottling was a little above the center of the lung from the second to the fourth interspace, and in this region most of the diffuse fibrosis was to be seen in the older cases. In some of the more advanced second-stage cases it is often most difficult to find very marked enlargement of the hilus shadow or thickening of the bronchial trunk shadows. This is true also of the third-stage cases. We have no explanation of this at the present time. It seems as though some of the cases went on rapidly in the second stage while others remained in the first stage for a long period of time. Fluoroscopic examinations are always valuable in the study of this condition. They explain, in a large measure, the difficulty these individuals have in

breathing. In some instances the diaphragm seems not to move, owing to the fibrosed condition of the lungs, particularly in a line with the linear trunk shadows running to the bases. The real cause is, no doubt, an inability of the lung to expand. In some instances the inner portion of the diaphragm is fixed, whereas the outer portions moves to a certain extent and it seems to be hinged at the point of contact of the linear trunk shadows. (Exhibition of slides.)

Dr. H. R. M. Landis: I think the cases studied in Joplin by Dr. Lanza are of more than ordinary interest, and, so far as I know, represent the most serious cases of silicosis yet reported, even outranking those of South Africa, which were by far the worst yet known. The *x*-rays have done much in discriminating between dusts which are entirely harmless in the sense of producing no definite pathological changes in the lungs and those which cause serious and crippling lesions. They differentiate the effects produced by the organic and the inorganic dusts. At one end of the scale we have pure silicosis which of itself, and entirely aside from any secondary tuberculosis lesion, is sufficient to cause absolute incapacity. There are other forms of inorganic dust, however, exposure to which does not prevent workers from being able to follow their trade for from forty to sixty years. In one instance a potter who had been apprenticed when a boy of ten, had worked at the trade until he was seventy. The effect of the concentration of the dust is well shown in the slides exhibited by Dr. Pancoast. One shows the lungs of a man who had been working in a coal mine for thirty-two years, another had worked outside on a breaker for thirty-eight years. While there was much dust in the work on the breaker, being outside, there was not the same concentration as in the mine. In the case working outside for thirty-eight years there was probably not one-quarter of the pulmonary damage as shown in the man working for thirty-two years underground.

The only explanation I can offer of the susceptibility to tuberculosis of the cases studied at Joplin is that the condition is so very acute. It is far more acute than the cases of silicosis reported from South Africa. We have no means of knowing whether the great irritation produced an acute inflammatory change rendering the tissues more susceptible to the tubercle bacillus. In the fibroid changes lasting over a number of years the field is much less favorable for the growth of the tubercle bacillus. In Dr. Lanza's study made some time ago, and to which he alluded tonight, the sociological background in these cases was considered. There were in the cases involved extremely bad living conditions such as would favor the development of tuberculosis. This is a feature which must be given due consideration. Furthermore, I think it is perfectly clear that without the

tubercle bacillus there can be no tuberculosis. Tuberculosis and pneumoconiosis are distinct problems. Our knowledge of pneumoconiosis has been greatly increased by the use of the *x*-rays. As Dr. Pancoast has said physical signs are absent or extremely indefinite in the first stage. In the advanced state our ability to elicit marked physical signs is of no particular moment so far as the patient is concerned, as the damage is already done.

# LIST OF PRIZES AND LECTURES

## THE WILLIAM F. JENKS MEMORIAL PRIZE

(Triennial)

| | | |
|---|---|---|
| 1889 | John Strahan, M.D. | Belfast (Ireland). |
| 1895 | Abram Brothers, M.D. | New York. |

Note—June 12, 1900, the William F. Jenks Memorial Prize Fund was transferred to the Library as the "William F. Jenks Memorial Library Fund."

## ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

(Annual)

| | | |
|---|---|---|
| 1890 | R. W. Philip, M.D. | Edinburgh (Scotland). |
| 1891 | L. Duncan Bulkley, M.D. | New York. |
| 1892 | R. H. L. Bibb, M.D. | Saltillo. |
| 1894 | G. E. de Schweinitz, M.D. | Philadelphia. |
| 1895 | Guy Hinsdale, M.D. | Philadelphia. |
| 1897 | Joseph Collins, M.D. | New York. |
| 1898 | S. A. Knopf, M.D. | New York. |
| 1899 | Robert Randolph, M.D. | Baltimore. |
| 1900 | David de Beck, M.D. | Cincinnati. |
| 1901 | George W. Crile, M.D. | Cleveland. |
| 1903 | William S. Carter, M.D. | Galveston. |
| 1905 | D. Chalmers Watson, M.D. | Edinburgh (Scotland). |
| 1907 | William Louis Chapman, M.D. | Providence. |
| 1908 | William T. Shoemaker, M.D. | Philadelphia. |
| 1910 | M. Katzenstein, M.D. | Berlin (Germany). |
| 1911 | Francis D. Patterson, M.D. | Philadelphia. |
| 1914 | H. B. Sheffield, M.D. | New York. |
| 1915 | J. E. Sweet, M.D. | Philadelphia. |
| 1917 | Wilburt C. Davison, M.D. | Baltimore. |

## NATHAN LEWIS HATFIELD PRIZE FOR ORIGINAL RESEARCH IN MEDICINE

(Triennial)

| | | |
|---|---|---|
| 1901 | Henry F. Harris, M.D. | Atlanta. |
| 1909 | Martin Henry Fischer, M.D. | Oakland. |
| 1917 | A. B. Macallum, M.D., F.R.S. | Toronto. |

NOTE.—November 29, 1913, by Supplemental Deed of Trust, the title of this Fund was changed to "Nathan Lewis Hatfield Prize and Lectureship."

## WEIR MITCHELL LECTURES

| | | |
|---|---|---|
| Jan. 17, 1911 | Arthur R. Cushny, M.D. | London. |
| Mar. 30, 1911 | Edmund B. Wilson, Ph.D., LL.D. | New York. |
| May 16, 1911 | Svante Arrhenius | Stockholm. |
| Nov. 3, 1911 | William T. Porter, M.D. | Boston. |
| Mar. 29, 1912 | William H. Howell, M.D. | Baltimore. |
| Oct. 21, 1912 | G. H. F. Nuttall, F.R.S., M.D. | Cambridge (England). |
| April 4, 1913 | H. P. Armsby, Ph.D., LL.D. | Pennsylvania. |
| Feb. 25, 1914 | Harvey Cushing, M.D. | Boston. |

## PUBLIC LECTURES

| | | |
|---|---|---|
| Feb. 16, 1910 | S. Weir Mitchell, M.D. | Philadelphia. |
| Nov. 17, 1910 | Simon Flexner, M.D. | New York. |
| Dec. 15, 1910 | William H. Welch, M.D. | Baltimore. |
| April 18, 1911 | James G. Mumford, M.D. | Clifton Springs, N. Y. |
| Nov. 20, 1911 | Talcott Williams, A.M., LL.D., Litt.D. | Philadelphia. |
| April 29, 1912 | Owen Wister, A.M., LL.D. | Philadelphia. |
| Feb. 17, 1913 | John K. Mitchell, M.D. | Philadelphia. |
| Feb. 15, 1916 | Daniel J. McCarthy, M.D. and Walter Estell Lee, M.D. | Philadelphia. |
| April 15, 1916 | Surgeon A. M. Fauntleroy | U. S. Navy. |

## MARY SCOTT NEWBOLD LECTURES

| | | |
|---|---|---|
| Mar. 29, 1917 | A. T. McCormack, M.D. | Bowling Green, Ky. |

## MÜTTER LECTURES

| | | |
|---|---|---|
| 1865 | J. H. Packard, M.D. | Philadelphia. |
| 1866 | J. H. Packard, M.D. | Philadelphia. |
| 1867 | J. H. Packard, M.D. | Philadelphia. |
| 1868 | Harrison Allen, M.D. | Philadelphia. |
| 1869 | J. H. Brinton, M.D. | Philadelphia. |
| 1872 | J. da S. Solis Cohen, M.D. | Philadelphia. |
| 1879 | S. W. Gross, M.D. | Philadelphia. |
| 1882 | E. O. Shakespeare, M.D. | Philadelphia. |
| 1885 | H. F. Formad, M.D. | Philadelphia. |
| 1888 | O. H. Allis, M.D. | Philadelphia. |
| 1890–1891 | Roswell Park, M.D. | Buffalo. |
| 1893–1894 | De Forrest Willard, M.D., and Guy Hinsdale, M.D. | Philadelphia. |
| 1896 | O. H. Allis, M.D. | Philadelphia. |
| 1899–1900 | J. B. Roberts, M.D. | Philadelphia. |
| 1901 | H. W. Cushing, M.D. | Boston. |
| 1902 | L. A. La Garde, M.D. | Washington. |
| 1903 | C. N. B. Camac, M.D. | New York. |
| 1904 | G. H. Monks, M.D. | Boston. |
| 1905 | A. O. J. Kelly, M.D. | Philadelphia. |
| 1906 | W. J. Mayo, M.D. | Rochester, Minn |
| 1907 | J. Rogers, M.D., and S. P. Beebe, M.D. | New York. |
| 1908 | G. W. Crile, M.D. | Cleveland. |
| 1909 | H. D. Fry, M.D. | Washington. |
| 1910 | T. W. Hastings, M.D. | New York. |
| 1911 | C. F. Nassau, M.D. | Philadelphia. |
| 1912 | J. C. Bloodgood, M.D. | Baltimore. |
| 1913 | R. C. Coffey, M.D. | Portland, Ore. |
| 1914 | F. H. Albee, M.D. | New York. |
| 1915–1916 | Rudolph Matas, M.D. | New Orleans, La. |
| 1916 | Nelson M. Percy, M.D. | Chicago, Ill. |
| 1917 | Chevalier Jackson, M.D. | Philadelphia. |

# ANNUAL REPORT OF THE LIBRARY COMMITTEE FOR 1918

MR. PRESIDENT: In accordance with the ordinances and By-Laws of the College, I herewith submit the following report of the Library Committee for the year 1918:

| | |
|---|---|
| Total number of volumes in the Library, including the bound volumes and 16,599 unbound "Reports" and "Transactions" . . . . . | 120,895 |
| Number of unbound "Theses" and "Dissertations" . | 9,518 |
| Number of unbound pamphlets . . . . . | 98,899 |

Included in the above are 3,527 volumes known as "Reserves," consisting of second copies of some of the more important periodical publications; also 2,983 volumes more or less incomplete.

The duplicates, which are not included in the above total, number 6,213 at this date.

The following table shows the number of volumes in the various divisions of the Library:

| | Bound. | Incomplete and unbound. | Total. |
|---|---|---|---|
| General Library . . . | 83,878 | 2,936 | 86,814 |
| Lewis Library . . . . | 13,646 | 44 | 13,690 |
| On permanent deposit: | | | |
| S. D. Gross Library . . | 3,572 | 3 | 3,575 |
| Library of the Obstetrical Society of Philadelphia | 217 | 0 | 217 |
| | | | 104,296 |

Received during the year from all sources 2,190 volumes, 9,100 pamphlets and 12,309 numbers of various periodicals.

Divided as follows:

| | Volumes. | Pamphlets. | Journals. |
|---|---|---|---|
| General Library | 1,593 | 9,100 | 12,309 |
| Lewis Library | 37 | | |
| S. D. Gross Library | 6 | | |
| By purchase from General Account | 184 | | |
| In exchange | 370 | | |
| | 2,190 | 9,100 | 12,309 |

Accessions (including 40 volumes of "reserves"):

| | |
|---|---|
| General Library | 1,685 |
| Lewis Library | 37 |
| S. D. Gross Library | 6 |
| | 1,728 |

Total increase in number of volumes for the year, 1,728.

Photographs received in response to requests sent out during the past year:

Fellows of the College, 2. Foreign, 6.
For the "War Album," Fellows of the College, 48.
Total number of portraits listed, 8,726.

The individual "donors" for the year ending November 1, 1918, number 408; this represents 828 distinct presentations. Each gift is duly acknowledged and properly recorded.

The following list shows the donation of twenty volumes or more and the number of volumes presented by the various publishing houses:

| | Volumes |
|---|---|
| Dr. M. W. Zimmerman | 78 |
| Dr. Hobart A. Hare | 22 |
| Dr. John H. Musser, Jr. | 26 |
| Dr. Horatio C. Wood | 22 |

From the publishing houses of:

| | |
|---|---|
| P. Blakiston's Son & Co. | 23 |
| F. A. Davis Co. | 7 |
| Lea & Febiger | 9 |
| J. B. Lippincott Co. | 10 |
| W. B. Saunders Co. | 52 |
| William Wood & Co. | 3 |

The Library is indebted for large gifts of pamphlets and unbound periodicals to the following donors:

Dr. Charles Baum
Messrs. P. Blakiston's Son & Co.
Dr. Burton Chance
Dr. S. Solis Cohen
Dr. Edward P. Davis
Dr. Charles W. Dulles
Dr. Augustus A. Eshner
Dr. J. P. Crozer Griffith
Dr. A. W. Hammer
Dr. Alfred Hand
Dr. Hobart A. Hare
Dr. Charles J. Hatfield
Dr. Frederick P. Henry
Dr. Addinell Hewson
Dr. Howard K. Hill
Dr. A. B. Hirsh
Dr. William W. Keen
Dr. John A. Kolmer
Dr. Henry R. M. Landis
Dr. Theodore Le Boutillier
Messrs. J. B. Lippincott Company
Dr. Edward Martin
Dr. Charles K. Mills
Dr. Elliston J. Morris
Dr. Charles C. Norris
Dr. Francis R. Packard
The Phipps Institute
Dr. David Riesman
Messrs. W. B. Saunders Company
Dr. George E. de Schweinitz
Dr. Charles F. Taylor
Dr. T. Turner Thomas
Dr. M. W. Zimmerman

780 new publications were added to the Library during the past year; 47 of these works were written or edited by Fellows of the College.

25 volumes were presented by the following authors or editors:

Dr. Albert P. Brubaker
Dr. Sprague Carleton
Dr. George W. Crile
Dr. Andrew F. Currier
Dr. Eldridge L. Eliason
Dr. P. Castro Escalada
Dr. Clifford B. Farr
Dr. John Favill
Dr. Albert P. Francine
Dr. Hobart A. Hare (editor)
Dr. Henry H. Janeway
Dr. William W. Keen
Dr. John W. Long
Dr. R. Tait McKenzie
Dr. J. Ewing Mears
Dr. Josephine H. Paine
Dr. Lewis S. Pilcher
Dr. Jay F. Schamberg
Dr. George E. de Schweinitz
Mr. Edward Trust (compiler)

10 volumes were sent by the publishers at the request of the following authors or editors:

Dr. James M. Anders
Dr. John C. Da Costa, Jr. (editor)
Dr. Francis X. Dercum
Dr. Milton B. Hartzell
Dr. Barton Cooke Hirst
Dr. John A. Kolmer
Dr. Edward Martin
Dr. George W. Norris
Dr. Richard M. Pearce
Dr. H. C. Wood, Jr. (editor)

Summary of the "Funds:"

| | Volumes purchased. | Cost. |
|---|---|---|
| Henrietta Rush Fales Baker Fund | 40 | $123.88 |
| Luther S. Bent Fund | 8 | 12.65 |
| William T. Carter Fund | 32 | 84.06 |
| Gerardus Clarkson Fund | 3 | 6.77 |
| Francis X. Dercum Fund | 36 | 100.22 |
| Louis A. Duhring Fund | 11 | 63.80 |
| John D. Griscom Fund | 28 | 81.48 |
| William F. Jenks Fund | 42 | 142.31 |
| Oliver A. Judson Fund | 0 | 0 |
| William V. and John M. Keating Fund | 14 | 30.74 |
| William W. Keen Fund | 12 | 37.11 |
| Library Endowment Fund | 13 | 117.72 |
| Horace Magee Memorial Fund | 181 | 474.72 |
| J. Ewing Mears Fund | 43 | 186.40 |
| Charles K. Mills Fund | 1 | 1.91 |
| Weir Mitchell Fund | 8 | 37.78 |
| John H. Musser Fund | 8 | 26.94 |
| Elizabeth K. Newcomet Fund | 21 | 57.99 |
| William F. Norris Fund | 18 | 56.69 |
| Charles A. Oliver Fund | 4 | 16.91 |
| Philadelphia Medical Society Fund | 2 | 5.42 |
| Lewis Rodman Fund | 13 | 63.27 |
| Douglas Stockton Warren Fund | 24 | 79.49 |
| John F. Weightman Fund | 4 | 2.35 |
| Caspar Wistar Fund | 30 | 74.55 |
| | 596 | $1,885.16 |

Special Accounts:

| | Volumes purchased. | Cost. |
|---|---|---|
| Fund for completing files of journals | 90 | $261.28 |
| Fund for rare and valuable books | 149 | 2,169.33 |
| New Book Fund | 8 | 18.23 |
| S. D. Gross Library Account | 3 | 18.85 |
| | 250 | $2,467.69 |

George B. Wood Fund for Library supplies, stationery, etc. Expended $298.40.

Morris Longstreth Fund; Expended on Account of Salaries, $601.53.

Catalogue Endowment Fund: Expended on Account of Salaries, $49.00.

| | 1918. | 1917. | Decrease. |
|---|---|---|---|
| Books bound | 952 | 1,205 | 253 |

| | 1918. | 1917. | Decrease. |
|---|---|---|---|
| Number of visitors to the Library | 3,050 | 3,864 | 814 |

| | 1918. | 1917. | Increase. |
|---|---|---|---|
| [Fellows of the College | 1,196 | 1,116] | 80 |

The Library has been kept open two evenings each week and on the six minor legal holidays, for the same hours and period of time as during the past year.

| | 1918 (78 evenings). | 1917 (79 evenings). | Decrease. |
|---|---|---|---|
| Visitors, evening | 314 | 510 | 186 |
| [Fellows of the College | 96 | 132] | 36 |

| | 1918 | 1917. | Increase. |
|---|---|---|---|
| Visitors, legal holidays | 51 | 50 | 1 |
| [Fellows of the College | 11 | 11] | 0 |

The above figures are included in the total number of visitors for the year.

| | 1918. | 1917. | Decrease. |
|---|---|---|---|
| Number of books consulted in the Library | 6,892 | 10,764 | 3,872 |

The number of books reported as "consulted in the Library" includes only those supplied on demand. Readers have access to the bound volumes kept on the shelves in the Reading-room, and the Fellows of the College have access to the Book-stacks. There are, therefore, a great many volumes consulted of which no accurate record can be kept.

| | 1918. | 1917. | Decrease. |
|---|---|---|---|
| Number of books taken out | 2,106 | 3,450 | 1,344 |

| | Daily average 1918. Volumes. | Daily average 1917. Volumes. | Decrease. |
|---|---|---|---|
| Use of study rooms | 105 | 197 | 92 |

| | Works. | Volumes. | Cards written. | Printed cards revised and filed. |
|---|---|---|---|---|
| Cataloguing | 932 | 997 | 8,222 | 2,034 |

All the books added to the shelves during the past year and 419 of the more important pamphlets have been catalogued and shelf-listed, and all bound volumes, including periodicals, transactions and reports, have been accessioned.

5,399 unbound pamphlets and reprints have been subject-headed and arranged alphabetically by subject and by author under the subject. In accordance with the orders of the Library Committee 1,287 bound volumes of miscellaneous pamphlets have been removed from the shelves, taken apart and the pamphlets subject-headed and arranged. The binding of the pamphlets by subjects will be held in abeyance until normal conditions have been restored after the present war has ceased.

Revision of the Catalogue: Number of cards revised, typewritten, examined and alphabeted for the year ending November 1, 1918: 5,281.

While our catalogue has been revised and our subject headings made to conform with the Index Catalogue of the Library of the Surgeon-General's Office to the end of the second series, this division of our catalogue department is to be retained permanently.

We have listed November 1, 1918, current periodical publications, including "Transactions" and "Reports" to be received as issued, to the number of 1,087; obtained through the following sources:

| | American. | Foreign. |
|---|---|---|
| Endowment Funds | 10 | 242 |
| By purchase from General Account | 63 | 377 |
| In exchange | 65 | 82 |
| Editors | 118 | 13 |
| Publishers | 39 | 5 |
| In addition, current numbers of periodicals have been received, at stated intervals, through the courtesy of the editors and editorial staff of the following journals: American Journal of the Medical Sciences Therapeutic Gazette | 54 | 19 |
| | 349 | 738 |

Actual number of current periodicals received during the year, including new subscriptions (4 American, 5 Foreign), total 539.

There is a decrease of 200 in the listed current periodicals and a decrease of 2 in the actual number received since November 1, 1917.

There has been a marked decrease in the number of American periodical publications received. This decrease is due apparently to the ruling of the Government, through its War Industries Board, relative to the discontinuance of exchanges and complimentary copies of periodicals from editors or publishers.

The decrease in the listed foreign periodicals is accounted for by the number of journals that we have been notified have ceased publication.

The Committee on Importations of the American Library Association, M. L. Raney, of Johns Hopkins University, Baltimore, Secretary, reports that after two years of unremitting labor they have attained success, and that four shipments of German periodicals, costing about $15,000, have reached New York, dated November, 1917. This Library has coöperated and made lists

in duplicate and triplicate according to requirements; and while notifications and bills were received between July and October, 1918, it was not until a few weeks ago that any journals reached us, then four packages arrived containing 285 numbers of German periodicals for the years 1917 and 1918, with the exception of 2 numbers for 1914 and 2 for 1916. In regard to the issues of previous years, which have been impounded or distrained, no settlement, it seems, has been reached.

The following is a list of the foreign schools of medicine with which we exchanged publications prior to the war:

| | | | |
|---|---|---|---|
| University of | Amsterdam | University of | Königsberg |
| " | Basel | " | Lausanne |
| " | Berlin | " | Leiden |
| " | Bern | " | Leipzig |
| " | Bonn | " | Liège |
| " | Breslau | " | Lund |
| " | Erlangen | " | Marburg |
| " | Geneva | " | Rostock |
| " | Giessen | " | Strassburg |
| " | Göttingen | " | Upsala |
| " | Griefswald | " | Utrecht |
| " | Halle | " | Würzburg |
| " | Heidelberg | " | Zurich |
| " | Keil | | |
| Faculty of | Medicine of | Bruxelles | |
| " | " | Paris | |
| " | " | Toulouse | |
| " | " | Yucatan | |

We have heard from Basel, Bern, Lausanne, Leiden, Lund and Toulouse during the past year and 95 dissertations have been added to our collection.

We have received in cash from the sale of duplicates for the current year ending November 1, 1918 : $440.50.

During the year we have distributed books and journals, on exchange account, to the following:

Boston Medical Library
Medical Library Association, Exchange Bureau
New York Public Library

And we have received exchanges from—

Boston Medical Library
Medical Library Association, Exchange Bureau
New York Public Library
Smithsonian Institution

With the aid received from exchanges and purchases made with funds appropriated for the purpose by the Library Committee, we have, since November 1, 1917, completed the files of the following journals:

Minerva Medica, Torino
Proceedings of the Royal Irish Academy, Dublin
The Zoölogist, London

Amount of fines collected from November 1, 1917, to November 1, 1918: $34.25.

The following is a list of the rare medical books and works of special interest received during the past year:

### Incunabula

(Total number of incunabula at this date, 234 Titles, 221 Volumes)

Aristoteles. Tractatulus propleumatum. [Leipzig, Kachelofen], 1494. [Hain 1732.]

*Excessively rare, as are all the XVth century editions of medical "secrets," which the middle ages ascribed to Aristotle. Very fine copy.*

Fund for Rare Books.

Auctoritates; Aristotoles, Senece, Boetii, Platonis, Apulei, Affricani, Empedoclis, Porphirii et Guilberti Porrintani. [Printed in some French Provincial town before 1500.]

*Unrecorded work from unknown French press. Pellechet has other editions, but not this one.*

Fund for Rare Books.

[Chiromanthia.] Venice, Ratdolt [Circa 1480]. [Hain-Copinger 4971.]

*First edition.*

Fund for Rare Books.

de Gorinchem, Henricus. Tractatus de superstitiosis. [Esslingae, Fyner, 1472.] [Hain-Copinger 7807.]
*Manuscript notes.*
Fund for Rare Books.

Gorus, Joannes de Sancto Geminiano. [Summa de exemplis et similitudinibus rerum.] Basle, Froben, 1499. [Hain 7546.]
Fund for Rare Books.

Harderwyck, Gerardus. [Epitomata seu reparationes totius philosophiae naturalis.] Colonia, Quentell, 1496. [Hain 8362.]
*First edition.*
Fund for Rare Books.

[Lumen animae seu liber moralitatum.] [Reutlingen, Greyff, 1479.] [Hain-Copinger 10331.] Fund for Rare Books.

Mensa philosophica. [Coloniae, Guldenschaaf, Circa 1485.]
*Manuscript notes.*
Fund for Rare Books.

Platina, Bartholomaeus. De honesta voluptate, et valetudine. Civitate Austrie, Gerardi, 1480. [Hain 13052.]
*First book printed in Cividale.*
Fund for Rare Books.

Rustichelli, Pietro Torrigiano. [Commentum in Galeni librum, qui Microtechni intitulatur.] Venetiis, Bonetus Locatellus, 1498. [Hain 15684.] Fund for Rare Books.

*Works of Special Interest*

de Acosta, Josephus. Historia natural y moral de las Indias; en que se tratan las cosas notables del cielo, y elementos, metales, plantas, y animales dellas; y los ritos, y ceremonias, leyes, y gouierno, y guerras de los Indios. Barcelona, Cendrat, 1591.
*Second edition of an interesting work. First account of mountain sickness.*
Fund for Rare Books.

ab Altomari, Donatus Antonius. De sedimento in vrinis tractatus.*** Neapoli, Amatus, 1558. Fund for Rare Books.

Anania, [Laur.] De natura daemonum. Venice, Aldus, 1581.
*Very rare first edition. Stamp of the Aldus Library on title-page.*
Fund for Rare Books.

Anonymi tractatus varii de orbis ad recentiorum mentem concinnati nunc primum in unum collecti, notulis aucti et publici juris facti. Ferrariae, Bernardini Pomatelli, 1690.

*Rare.*

Fund for Rare Books.

Antonius, Franciscus. Panacea aurea; sive, Tractatus duo de ipsius auro potabili nunc primum, in Germania ex Londinensi exemplari excusi,***Henr. Nollius.*** Hamburgi, Froben, 1618.

Fund for Rare Books.

Artemidorus Daldianus. De somniorum interpretatione, libri quinque, iam primum á Jano Cornario latina lingua conscripta. Basileae, Froben, 1539.

*First Latin edition.*

Fund for Rare Books.

Aubert, Jacques. Des natures et complexions des hommes, et d'une chacune partie d'iceux, et aussi des signes par lesquels on peut discerner la diuersité d'icelles. Lausanne, François le Preux, 1571.

*Extremely rare imprint. First edition.*

Fund for Rare Books.

Baccanelli, Joannes. De consensu medicorum, in curandis morbis, libri quatuor.*** Venetiis, in vico Sanctae Mariae Formosae ad signum Spei, 1556. Fund for Rare Books.

Bacci, Andrea. L'Alicorno, discorso***nel quae si tratta della natura dell' Alicorno, e delle sue virtu eccellentissime. Florence, Marescotti, 1573.

*First edition. Dedicated to Francesco Medici.*

Fund for Rare Books.

Le batiment des receptes, traduit d'italien en François, et augmenté d'une infinité de beaux secrets depuis peu mis en usage. Avec un autre petit traité de recepte intitulé le grand Jardin, [d'Albert le Grand]. Troyes, Garnier, 1738.

Presented by Charles K. Mills, M.D.

Baverius, Joh. Trattato mirabile contra peste. Uno Conseglio famoso promulgato a Venesia contra la peste, et altri rimedii e recette perfettisimi et approvati. Bologna, Beneditti, 1523.

*Rare and curious little early-printed work on the Plague, bound in old coloured wrappers.*

Fund for Rare Books.

Berrettarius, Elpidius. Tractatus de risu. Florentiae, Juntae, 1693.
*Rare early treatise.*
Fund for Rare Books.

Blackrie, Alexander. A disquisition on medicines that dissolve the stone. In which Dr. Chittick's secret is considered and discovered. London, Wilson, 1766.
*Scarce.*
Fund for Rare Books.

Bodin, Jo[annes]. De magorum demonomania, libri IV. Basle, Guarinus, 1581. Translated by Lotario Philopono, pseud. of Fr. Iunius Medicus.
*Contains his Opinionum Ioannes Wieri Medici confutatio.*
Fund for Rare Books.

Bonham, Thomas. Chyrurgian's closet; or, An antidotarie chyrurgicall, furnished with varietie and choyce of; apophlegms, balmes, baths, caps, cataplasmes, caustickes, cerots, clysters, collyeries.*** Drawne into method and forme by Edward Poeton. London, Miller, 1630. Fund for Rare Books.

Bonomo, Gio[vanni] Martino. Discorso del medico; sopra il governo del vivere principalmente per convalescenti, malsani e delicati, ed à prencipi vtilissimo. Venetia, Polo, 1620.
Fund for Rare Books.

Browne, Sir Thomas. Religion du medicin, c'est à dire; description necessaire touchant son opinion accordante avec le pur service Divin d'Angleterre.*** [La Haye] 1668.
Fund for Rare Books.

de Cabreyra, Goncalo Rodrigues. Compendio de muytos e varios remedios de cirugia y outras cuosas curiosas, recopilados do Tesoure de pobres, y outros autores. E nesta quarta impresso enmendado y acrescentado hum tratado de perseverar o mal de peste. Lisboa, Alvarez, 1617. Fund for Rare Books.

Calestani, Girolamo. Osservationi*** nel comporre gli antidoti et medicamenti che piu si costumano in Italia. Venice, Francesco de Franceschi, 1568.
*Rare and very copious collection of receipts in use in the Renaissance.*
Fund for Rare Books.

Cavallo, Tiberius. Essay on the medicinal properties of factitious airs with an appendix on the nature of blood. London, Dilly, 1798.
Presented by Henry K. Pancoast, M.D.

Charter of the Royal hospital of King Charles II, etc., near Dublin, for the maintenance of antient and maimed officers and soldiers of the army of Ireland. Dublin, Faulkner, 1760.
Fund for Rare Books.

Ciuccio, Antonio Filippo. Promptuarium chirurgicum in quo agitur de morbis, qui indigent manuali operatione artis chirurgiae. Maceratae, Picinus, 1679–1680.
*First edition. Very rare.*
Fund for Rare Books.

Crooks, Helkiah. Description of the body of man; together with the controversies thereto belonging, collected and translated out of all the best authors of anatomy, especially out of Gasper Bauhinus and Andreas Laurentius. London, Iaggard, 1615.
*First edition. By the printer of the first Shakespeare Folio. Same woodcuts used in both.*
Fund for Rare Books.

Deusingius, Antonius. Exercitationes physico-anatomica de nutrimenti in corpore elaboratione,*** Groningae, Bronchorsti, 1660.
Fund for Rare Books.

Deusingius, Antonius. Historia foetus extra uterum in abdomine geniti.*** Groningae, Cöllen, 1661.
*Extremely rare. Unknown to Graesse, Brunet and Deschamps.*
Fund for Rare Books.

[Dickson, D.] Essay on the possibility and probability of a child's being born alive, and live, in the latter end of the fifth solar, or in the beginning of the sixth lunar month. Edinburgh, Watson, 1712.
Fund for Rare Books.

Dionis, Pierre. Anatomia corporis humani, juxta circulationem sanguinis et recentiores observationes, in horto regio Parisino ab ipso autore demonstrata.*** Amstelodami, Cramer, 1696.
Fund for Rare Books.

The doctor's physician; or, Dialogues concerning health. Translated out of the original French. London, Hindmarsh, 1685.
*Translation attributed to John Evelyn.*
Fund for Rare Books.

Douglas, John. A short account of mortifications and of the surprising effect of the Bark, in putting a stop to their progress. London, Nourse, 1732.

*A rare pamphlet.*

Fund for Rare Books.

Fioravanti, Leonardo. Il tesoro della vita humana. Diviso in libri quattro.*** Venetia, Sessa, 1570. Fund for Rare Books.

Flagellum Dei; or, A collection of the several fires, plagues, and pestilential diseases that have hapned in London especially, and other parts of this nation, from the Norman Conquest to this present, 1668. London, Printed for C. W., 1668.

*Extremely rare.*

Fund for Rare Books.

Friccius, Melchior. Tractatus medicus de virtute venenorum medica. Ulmae, Author, 1701. Fund for Rare Books.

Garzoni [Thomaso]. Il theatro de vari, e diversi cervelli mondani, nouavamente formato, e posto in luce.*** Venetia, Somasco, 1591.

*Rare edition.*

Fund for Rare Books.

Glauber, J. R. Tractatus de signatura salium, metallorum, et planetarum.*** Amstelodami, Jansson, 1659.

Fund for Rare Books.

van Helmont, Joannes Baptista. Ternary of paradoxes; of the magnetic cure of wounds, nativity of tartar in wine, image of God in man. Translated***by Walter Charleton. London, Lee, 1650.

Fund for Rare Books.

In disem büechlin wirt erfunden von Complexion der menschen. [Augspurg, 1510.]

*Extremely rare work on temperament. Quaint wood-cut symbolizing the four elements in their relation to man.*

Fund for Rare Books.

Indagine, Joannes. Introductiones apotelesmaticae elegantes, in chyromantiam, physiognomiam, astrologiam naturalem, complexiones hominum, natures planetarum. Strassburg, Schott, 1522.

*First edition of a famous book which was translated and pirated into many languages.*

Fund for Rare Books.

Labadie, Emanuel. Traicté de la peste, divisé en diagnostic, prognostic et curation. Avec des observations notables. Tolose, Bosc, 1620. Fund for Rare Books.

Lagneus, David. De medici harmonica chemica; seu consensus philosophorum chemicorum magno cum studio et labore in ordinem digestus. Paris, Morelii, 1611.

*First edition of rare work on alchemy.*

Fund for Rare Books.

de La Mettrie, [J. O.] Traité de la petite verole avec la maniere de guerir cette maladie, suivant les principes de Herman Boerhaave, et ceux des plus habiles medecins de notre tems. Paris, Huart, 1560. Fund for Rare Books.

Laurentius, Andreas. Les oeuvres. Traduits de Latin en François par Théophile Gélee. Paris, Michel Soly, 1639.

*Most complete edition of the translations of this celebrated physician's works.—Brunet.*

Fund for Rare Books.

Lemnius [Ziriczaeus], Levinus. Touchstone of complexions, expedient and profitable for all such as bee desirous and carefull of their bodily health. London, Sparke, 1633.

*English translation of this popular work on temperament and hygiene.*

Fund for Rare Books.

Leoniceus, Nicolaus. Dialogi nunc primum in lucem editi quorum nomina proxima pagina habentue. Venetiis, Gregorius de Gregorius, 1524.

*Very rare first edition of a beautifully printed work.*

Fund for Rare Books.

Licetus, Fortunius. De ortu animae humanae. Genoa, Pavonius, 1602.

*Very rare first edition.*

Fund for Rare Books.

à Lindhout, Henricus. Introductio in physicam indiciariam in qua brevissime sed accurate vera astrologiae fundamenta.*** Hamburg, Ohr, 1597.

*Very rare first edition dedicated to Queen Elizabeth.*

Fund for Rare Books.

Lister, Martin. Sex exercitationes medicinales de quibus morbis chronicis.*** Londini, Smith, 1694.

*First edition.*

Fund for Rare Books.

[Madan, Martin.] Thelyphthora; or a treatise on female ruin, in its causes, effects, consequences, prevention and remedy. 3 Vols. London, Dodsley, 1780–1781.

*First edition. Fine copy of very scarce book on polygamy.*

Fund for Rare Books.

de Maets, Carl. Prodomus chemiae rationalis, ratiociniis philosophicis, observationibus medicis.*** Lugd. Batav., de Graaf, 1586.

Fund for Rare Books.

Malpenga, A. Instruttione brevissima di cirurgia. Turin, Pizzamiglio, 1603.

*Excessively rare work. The earliest edition known to bibliographers is ten years later.*

Fund for Rare Books.

Mancinellus, Ascanius. Floridum opusculum***de morsu canis rabidi eiusque curatione cum nonnullis quaestis notatu dignis. Venetiis, Hugolinus, 1587. Fund for Rare Books.

Margarita philosophica, cum additionibus novis; ab auctore suo studiosissima revisione quarto superadditis. Basle, Furter, 1517.

*Some of the woodcuts are reproduced in the Halliwell Phillips folio edition of Shakespeare.*

Fund for Rare Books.

Mattioli, Pietro Andrea. Il Dioscoride***coi suoi discorsi, da esso la seconda volta illustrati. Vinegia, Valgrisi, 1548.

*Rare Italian translation of this famous Greek writer on botany.*

Fund for Rare Books.

Merrett, Christopher. Short view of the frauds, and abuses committed by apothecaries as well in relation to patients, as physicians and of the only remedy thereof by physicians making their own medicines. London, Allestry, 1669.

Lex Talionis; sive vindiciae pharmacoporum; or a short reply to Dr. Merrett's book, and others, written against the apothecaries; wherein may be discovered the frauds and abuses committed by Doctors professing and practising pharmacy. London, Pitt, 1670.

Medice cura teipsum; or the apothecaries plea, in some short and modest animadversions upon a late tract entitled a Short view of the frauds and abuses of the apothecaries and the only remedy by physicians making their own medicines, by Christopher Merrett. From a well wisher to both societies. London, Miller, 1671. Fund for Rare Books.

Moralis, Georgius. Magni Hippocratis Coi ars parva, sive aphorismorym sectiones VII. Venetiis, Iuntas, 1653.
Presented by H. B. Allyn, M.D.

Nicolai, Henrius Albertus. De directione vasorum pro modificando sanguinis circulo; diatriba mechan-anatomica. Strasburg, Kuersner, 1725.
*A complimentary reference to Newton and other English scientific investigators in the Preface.*
Fund for Rare Books.

Norton, S. Elixir, seu medicina vitae, seu modus conficiendi verum aurum. Francofurti, Rötel, 1630.
*Very rare.*
Fund for Rare Books.

Le palais des curieux; ou, L'algebre et le sort donnent la décision des questions les plus douteuses, et où songes et les visions nocturnes sons expliqués selon la doctrine des anciens. Troyes, Garnier, 1738.
Presented by Charles K. Mills, M.D.

Pasch, Georgius. De novis inventis, quorum accuratiori cultui facem praetulit antiquitas, tractatus.*** 2 Ed. Lipsae, Grossi, 1700.
*Rare enlarged edition.*
Fund for Rare Books.

Porto, Antonio. De peste libri tres, quibus accedit quartus de variolis et morbillis. Venice, Dehuchinus, 1580.
*Very rare.*
Fund for Rare Books.

Primrose, (James). De Mulierum Morbis et Symptomatis libri quinque.*** Roterdam, Leers, 1655.
*This work a first edition.*
Fund for Rare Books.

Quercetanus, Josephus. Le pourtraict de la santé.*** Paris, Morel, 1620.

*Very rare.*

Fund for Rare Books.

Relazione del contagio statio in Firenze l'anno 1630 e 1633.*** Nouva ed. Firenze, Guiducci, 1714.

*Catalogue of all the plagues from* 2443 *B.C. to* 1713 *A.D.*

Fund for Rare Books.

Rosselli, Cosma. Thesaurus artificiosae memoriae, concionatoribus, philosophis, medicis, iuristis, oratibus. Venice, Paduanius, 1579.

*Numerous woodcuts, specimens of Hebrew, Arabic, Turkish, Chaldic.*

Fund for Rare Books.

Ryff, Walter Hermann. Medicinae theoriae practicae breve quidem,***quibus adjecimus A. Cornelii Celsi sententias elegantissimae ex libris ipsius diligenter selectas. Argentorati, Knoblock, 1542. Fund for Rare Books.

Saccus, J. P. Novum systema medicum ex unitate doctrinae recentiorum et antiquorum. Parma, Josephus ab Oleo, 1693.

*Very rare. Unknown to most bibliographers.*

Fund for Rare Books.

Salmon, William. Medicina practica; to which is added, the philosophick works of Hermes Trismegistus, Kalid Persicus, Geber Arabs, Artefius Longaevus, Nicholas Flammel, Roger Bacon, and George Ripley. London, Hawkins, 1692.

Presented by Henry Pancoast, M.D.

Salernum, School of. De conservanda bona valetudine.*** Pariis, Cauellar, 1545. Fund for Rare Books.

Salernum, School of. Le regime de santé.*** Trad. et comm. par Michel le Long. Avec l'epistre de Diocle Carystiem, touchant les presages des maladies à Antigon, Roy d'Asie; et le serment d'Hippocrate, mis de pros en vers François par le mesme. 4 Ed. Paris, de La Coste, 1649. Fund for Rare Books.

Schröder, Johannes. La pharmacopée raisonnée; commentée par Michel Ettmuller. 2 Vols. Lyon, Amaulry, 1698.

*One of the best books published in the XVIIth Century.*

Fund for Rare Books.

Soris, Gio. Battista. Curioso, compendioso, et utilissimo trattato circa il reggimento, e conseruatione della sanità. Pavia, Ardizzoni, 1616.

*Scarce, only edition.*

Fund for Rare Books.

Soris, Gio. Battista. Tesoro di chirurgia, nel quale si contengono nove libri.*** Pavia, Maggi, 1632.

*Rare treatise on surgery, contains a long section on the plague.*

Fund for Rare Books.

Tagault, Joannes. La chirurgia, tradotta in buona lingua volgare. Vinegia, Tramezzino, 1550.

*Extremely rare first Italian edition.*

Fund for Rare Books.

Tanner, John. The hidden treasures of the art of physic fully discovered in four books. London, Sawbridge, 1659.

*First edition.*

Fund for Rare Books.

Terrillus, Dominicus. De causes mortis repentinae distinctiss. tractatio, in qua etiam disputatur quid sit mors, et vita in genere, et quae mortis causae communes. Venetiis, Zenarii, 1615.

*Scarce.*

Fund for Rare Books.

Themistius. Paraphrasis in Aristotelis Posteriora et Physica. Venice, Scotus, 1542.

*So rare that even the special bibliography on Aristoteliana by Schwab does not know it. Only Mazzucchelli, II, 260 describes this book. British Museum has later edition.*

Fund for Rare Books.

Thyraeus, Petrus. Loca infesta, hoc est, de infestis, ob molestantes daemoniorum et defunctorum hominum spiritus, locis liber unus.*** Lugduni, Phillehotte, 1599. Fund for Rare Books.

Thomaius Ravennas, Petrus. Foenix***memoriae. Venetiis, Sessa, 1532.

*Extremely rare.*

Fund for Rare Books.

Tiling, Matthias. De recidivis tractatus aureus, veterum et neotericorum medicorum fundamentis superstructus, et ad usum practicorum insignem accomodatus. Mindae, Pileri, 1679.

*This work like all works printed at Minden, rare.*

Fund for Rare Books.

Tyfernus, [Aug.] Libellus de mirabilibus civitatis Puteolorum et locorum vicinorum; ac de nominibus virtutibus que balneorum ibidem existentium. Naples, Mair, 1597.

*First book on the baths and town of Pozzuoli, of which the first edition was published in the XVth Century.*

Fund for Rare Books.

Vair, Leonard. Trois livres de charmes, sorcelages, ou enchantemens, mis en François par J. Baudon. Paris, Chesneau, 1583.

*Rare first French edition of one of the most interesting works on witchcraft. The original Latin edition was published in the same year.*

Fund for Rare Books.

Valescus de Taranta. Epitome operis perquam utilis morbis curandis in septem congesta libros. Autore Guidone Desiderio. Lugduni, Tornaesius, 1560.

*Very rare. Unknown to most bibliographers.*

Fund for Rare Books.

Valverde de Hamusco, Juan. Anotomia del corpo humano. Nuovamente ristampa.*** Vinetia, Giunti, 1606.

*Numerous full-page anatomical plates. One of the finest XVIIth Century books on anatomy.*

Fund for Rare Books.

Victorius Faventinus, Benedictus. Medicinalis consilia ad varia morborum genera. Venetiis, Valgrisius, 1551.

Fund for Rare Books.

Victorius Faventinus [de Victorius], Leonellus. Practica medicinales, seu, si mavis de medendis morbis membrorum omnium totius humani corporis.*** Venetiis, Valgrisius, 1546.

Fund for Rare Books.

Vitet, [Louis]. Pharmacopée de Lyon ou exposition méthodique des medicaments simples et composes. Lyon, Perisse, 1778.

Fund for Rare Books.

*Other Interesting Additions.*

Mills, Charles Karsner. Falls of Schuylkill. I. Association with the University of Pennsylvania. II. Military History. Phila., 1912–1914.

*Presentation-copy of unique work on early history of Philadelphia. Specially bound in crushed green levant.*

Presented by the Author.

Pomander-cane, presented by Sir William Osler, March 6, 1918.

We have also received during the year a number of interesting and more or less valuable autograph letters.

The Photostat has been in operation on the stated days, Wednesday and Friday, during the past year. 96 prints have been furnished on application to Fellows and others. The work for the Library has been continued according to the original instructions of the Committee. 7,506 large and small prints have been made and 32 volumes of incunabula completed, making a total of 71 Photostat copies of incunabula to date. In addition a copy for the Library was made of the work of John Hall, son-in-law of Shakespeare, entitled "Some Observations in English bodies of eminent persons in desperate diseases." Englished by James Cook. This is quite a rare book, although more than one edition was printed. The first English translation appeared in 1657.

The alterations to the Book-stacks were completed with the installation of the ventilating system and air-washing machine at the beginning of the year, and the Stacks and their contents have had a first cleaning. It would appear now that the only dust or dirt that can enter the Stacks will be that carried in by the attendants and the Fellows who have free entrance. Regular cleaning and the use of the vacuum will be continued without the constant handling of the books.

An account of stock has been taken in connection with the shelf-list, and with the exception of three small books of no particular value, which will be replaced, every volume is in place by class and number. The stock taking of periodical literature is now going on.

No improvement can be reported in conditions covering the

receipt of foreign medical literature; according to bills received packages containing both books and journals have been lost in transit during the year. The only change is the result of the activity of the American Library Association, of which mention has been previously made in this report.

During the year there has been a slight increase in the number of new publications received: 16.

The following table shows the variation in the number of new books received for the past four years:

| | 1918. | 1917. | 1916. | 1915. |
|---|---|---|---|---|
| United States . . | 506 | 456 | 425 | 283 |
| Great Britain . . | 164 | 121 | 161 | 100 |
| France . . . . | 96 | 144 | 15 | 8 |
| Germany . . . | 4 | 20 | 90 | 175 |
| Other countries . . | 10 | 23 | 43 | 8 |
| | 780 | 764 | 734 | 574 |

The additions to the principal of the Library Endowment Funds during the past year amount to $7,433.00, making a total at this date of $327,858.92.

It will be noted that there is again reported a decrease in the number of visitors to the Library; in the number of books consulted and in the number of books taken out; the reason is, of course, plain to all. The call of the Government on the medical profession of the country has been greater than ever before.

There are two reasons for the decrease in the number of volumes bound: the first is economy, as under present conditions the price has nearly doubled; the second is the fact that fewer periodical publications have been received.

In connection with the figures and tables included each year in the reports, the use of the Library as indicated by the number of visitors, the volumes consulted and the volumes taken out, it should be borne in mind that these figures do not indicate the progress and growth of usefulness of the library. They are of interest principally as indicating the activities and more especially the local

activities of the medical profession in literary work. How much this has been influenced by the war has already been pointed out and needs no additional comment. Further, a medical library cannot as regards its usefulness and its worth be viewed from the same standpoint as a general library. In the latter—for instance, in the Public Library—usefulness and success may be fairly estimated by the amount of the attendance and the use of the books. That such a test does not apply to a medical library goes without saying. The value and success of the latter is to be judged by the increase in the number of the volumes and journals upon its shelves and by the increase in its capabilities for satisfying the needs of the scientific investigator and the student of medical literature.

LIBRARY COMMITTEE,
FRANCIS X. DERCUM, M.D.,
Chairman.

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